Invitation to Tender
General Service

NCC FILE NO.
NO DE DOSSIER DE LA CCN: **NR60**

ADDRESS ENQUIRIES TO: ADRESSER LES DEMANDES DE RENSEIGNEMENTS À: **Nathalie Rheault** TEL - TÉL: 613-239-5678 ext. 5080 E-mail : nathalie.rheault@ncc-ccn.ca	**NCC CONTRACT NO.:** BID CLOSING/CLÔTURE DE L'OFFRE: **September 5 , 2013 at 3:00 p.m. Ottawa time**
RETURN ORIGINAL Submit tender on this form and return it to: **RENVOYER L'ORIGINAL** Veuillez soumissionner en vous servant de la présente formule et la retourner au: →	**Senior Contract Officer – Nathalie Rheault** **National Capital Commission/Commission de la capitale nationale** **Procurement Services/Services de l'approvisionnement** **40 Elgin Street/40, rue Elgin** **3rd Floor/3e étage** **Ottawa, Ontario K1P 1C7**
DESCRIPTION OF SERVICES: To provide all goods and services related to the **"Operation and Maintenance of the Hog's Back Swing Bridge"** project, as per the attached drawing and specifications.	**DELIVERY LOCATION:** Ottawa, ON

1. OFFER

1.1. The undersigned tenderer (hereinafter called the "Contractor" hereby offers to the National Capital Commission (NCC) to furnish all necessary tools, plant services, materials and labour to execute and complete in a careful and workmanlike manner the work as set out under the "Description of Works" hereon, which is more particularly described in the Plans and Specifications attached for the **Annual fee & SOA unit rates** as set out in clause 4 on page 2.

2. GENERAL AGREEMENT The Contractor agrees:

The service contract will be for a period of five (5) years beginning upon contract award.

2.1. to provide at his own cost the following securities:
(a) with tender to ensure entry into contract a bid bond from an acceptable company, a certified cheque made payable to the National Capital Commission or "Cash" in the amount of **N/A;**

(b) upon notification of acceptance of tender if requested to do so, a Performance Bond in the amount of **$3,000**.

2.2. that this Offer and Agreement, the Plans and Specifications referred to in Clause 1 above, the instructions to bidders, the general conditions, occupational health and safety requirements, security requirements and the Supplier – Direct payment and tax information form and all Addenda shall be and are the complete tender and this offer is made subject to the provisions contained therein.

2.3. that this offer supersedes and cancels all communications, negotiations and agreements relating to the work other than contained in the complete tender and is irrevocable for 30 days from the Tender Closing Time shown hereon, and in the event that security is provided with this tender, it will be forfeited if the Contractor refuses a contract if this tender is accepted and executed on behalf of the NCC.

2.4. that the complete tender together with and subject to all the provisions contained therein shall, when accepted and executed on behalf of the NCC, constitute a binding contract between the Contractor and the NCC.

2.5. Bonds shall be in an approved form, properly completed, with original signature(s) and issued by an approved company whose bonds are acceptable to the NCC either at the time of solicitation closing or as identified on the list displayed at the following Website:
http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=12027&section=text#L

3. SECURITY REQUIREMENTS

3.1. Since the National Capital Commission (NCC) complies with the provisions of the Policy on Government Security, the Contractor shall ensure that none of the Employees of the Contractor and others for whom the Contractor is responsible and who are to perform the Contractor's obligations under this Contract constitute a security risk and shall, at the request of the NCC, ensure that all Employees of the Contractor and others for whom the Contractor is responsible who are to perform the Contractor's obligations under this Contract complete the NCC's security screening process in order that the NCC may obtain a security assessment of that person before accessing any site included in this Contract.

3.2. For this contract, it was determined that the NCC shall require **Reliability status**. A credit check can be performed when the duties or task to be performed require it or in the event of a criminal record based on this type of offence.

3.3. The supplier shall appoint a Company Security Representative which will act as liaison with the NCC Corporate Security to ensure coordination of the screening process.

3.4. The NCC shall process the clearances once the individuals have been identified.

4. TENDER

4.1. The Contractor agrees that the following is the **annual fixed fee & unit rates** referred to in clause I on Page 1.

Item	**Description**	**Spring Start up (once yearly) LUMP SUM Preventative Maintenance A**	**Fall shut down (once yearly) LUMP SUM Preventative Maintenance B**	**Every month for 6 Months per year (May to October) LUMP SUM Predictive Maintenance C**
1	Hog's Back Swing Bridge	$	$	$
			SUB-TOTAL: A+ B +C	$
			OHST 13%	$
			(1) TOTAL TENDER for 1st year: A + B +C including taxes	$
			(2) Bidder to transfer Total amount from the Standing Offer Agreement rates Reactive Maintenance - Appendix 7-A-2	$
			Total tender for 1st year (1) + SOA rates from Appendix 7-A-2 (2)	**$**

4.2. The basis of award is low total cost to the NCC for the total tender for the 1st year including taxes AND SOA rates from appendix 7-A-2.

4.3. I/We acknowledge receipt of the following addenda and have included for the requirement of it/them in my/our tendered price: _____ (Bidder to enter number of addenda issued, if any)

4.4. The NCC reserves the right to not accept the lowest or any of the tenders submitted, to cancel this tender, and/or to reissue the Tender in its original or revised form. The NCC also reserves the right to negotiate with the successful tenderer and or all tenderers

4.5. All questions must be submitted **in writing** to Nathalie Rheault, Senior Contract Officer at nathalie.rheault@ncc-ccn.ca. or by fax at 613-239-5007.

Tenders received after the closing date and time will not be accepted.

We hereby OFFER to sell and/or supply to the National Capital Commission upon the terms and conditions set out herein, the supplies and/or services listed above and on any attached sheets at the submitted price(s).

Contractor's Name and Address – Nom et adresse de l'entrepreneur	_____ Print Name - Nom en caractère d'imprimerie _____ _____ Signature Date
Telephone no. No. de téléphone : _____ Fax no. No. de télécopieur : _____	_____ Witness Signature – Signature du témoin

Accepted & executed on behalf of the NCC this day of , 2013 in the presence of

NCC CONTRACT OFFICER SIGNATURE / SIGNATURE DE L'AGENT AUX CONTRATS DE LA CCN	**WITNESS SIGNATURE / SIGNATURE DU TÉMOIN**

INVOICING:

Send the original invoice and 1 copy to:
Accounts Payable
National Capital Commission
202-40 Elgin Street
Ottawa, ON K1P 1C7

Or by email at the following address: **payables@ncc-ccn.ca**

To ensure prompt payment, please prepare your invoice

FACTURATION :

Envoyer la facture originale et 1 copie par la poste à :
Comptes Payables
Commission de la capitale nationale
40 rue Elgin, pièce 202
Ottawa, ON K1P 1C7

Ou par courriel à l'adresse suivante: payables@ncc-ccn.ca .

Afin de vous assurer d'un règlement rapide, veuillez

in accordance with the prices quoted. Errors in invoicing can cause delay of payment. Submit your invoice to the address shown above and clearly indicate the Purchase Order number.

préparer votre facture selon les prix cotés. Des erreurs dans la facturation peuvent causer des retards de paiement. Nous vous prions de soumettre votre facture à l'adresse mentionnée ci-dessus et indiquer clairement le numéro de bon de commande.

Additional Clauses for Standing Offer Agreement

Operation and Maintenance of the Hog's Back Swing Bridge

1.0 Introduction

The National Capital Commission (NCC) wishes to retain the services of qualified firms to provide **Ongoing Operation and Maintenance of the Hog's Back Swing Bridge** on an "as and when requested" basis under a Standing Offer Agreement (SOA).

The term proponent, used throughout this document, is defined as the entity submitting a proposal and shall mean a firm, an entity formed through a prime consultant/sub-consultant relationship, a consortium or a joint venture. Proponents shall provide all of the required services enumerated within the terms of reference.

2.0 General Instructions

2.0.1 SOA duration

The duration of the SOA is for a period of five (5) years from tender award. The unit price proponents quote in *Appendix 7-A-2* the *"SOA rates"* form will be applicable for the first year of the contract. The following years the contractor's rates will be increased by the rate of inflation for consumer price index for the City (Ottawa-Gatineau) see section 2.16 of the terms of reference.

The NCC reserves the right to **terminate** the SOA should the firm show repeated failure to satisfactorily manage the quality, quantity, timeliness and/or respect the rates of the project, and of sub-consultants / specialists.

2.0.2 SOA expenditure limits (per purchase order and estimated expenditure)

The maximum all-inclusive amount payable for any one purchase order (call-up) shall be $10,000 CDN including all fees, disbursements, sub-consultant costs and all applicable taxes. Change Orders may be processed against any call-up to a maximum of 20% of the initial total call-up amount.

The NCC reserves the right to request quotations from any firm when the initial estimate of the work exceeds $10,000 CDN all inclusive.

The estimated expenditure for the resulting Standing Offer Agreement will be $200,000.00 on CDN. As operational requirements become more defined, the NCC reserves the right to increase the total estimated expenditure but in no circumstance will the total estimated expenditure be more than 10% of the initial total expenditure.

2.0.3 Purchase Orders (Call-ups)

The NCC reserves the right to on occasion:

- request SOA firms to seek offer-of-services from sub-consultants / specialists other than those proposed by the SOA firms, and
- as required, consider offer-of-services from sub-consultants / specialists named by NCC.
- may be requested to use sub-consultant firms already on SOA with the NCC at which time, the sub-consultant is expected to quote using the rates of his SOA.
- to reassign individual call-ups on any SOA where the sub-consultant team does not meet NCC project manager requirements.

Once the SOA is in place, individual project requests for work will be handled as *purchase orders* (or *callups*) against the SOA. Quotations provided must be detailed, showing the name of the proponent, their hourly rate according to the SOA and the estimated number of hours that will be required to perform the work. Disbursements, fees and applicable taxes must be indicated separately.

The number of purchase orders awarded by the NCC will vary annually, depending on workload and funding. The NCC cannot guarantee the number of purchase orders SOA firm will receive in any given year.

Work should not proceed until NCC's Contracts has issued a purchase order number specific to that call-up.

If no extra work is authorized by the NCC Project Manager, the written quotation shall constitute the maximum amount payable under the purchase order.

2.0.4 Billing the NCC

To ensure prompt payment, please prepare your invoice in accordance with the prices quoted. Errors in invoicing can cause delay of payment. Submit your invoice to the address shown on the Purchase Order and clearly indicate the Purchase Order number.

Itemized invoices are to be submitted to NCC Accounts Payable at intervals of not less than 30 days, according to a schedule approved by the NCC Project Manager managing the call-up (e.g. monthly billing, billings at completion of each phase of the project, or other). Total fees (including expenses) will remain within the maximum authorized by each purchase order.

Any extras or charges above the original written quotation (offer of services) must be discussed with the NCC Project Manager and **authorised by the NCC *in advance of the execution of the work***. The NCC cannot guarantee there will be compensation for extra work undertaken without prior written authorisation.

For each invoice/billing submitted to NCC, SOA firm shall:

- Supply a current accounting of time-costs resulting from the SOA firm's work on the call-up, as well as all approved related project costs and sub-consultant costs;
- Clearly identify all applicable taxes, stated as separate line items on the invoice
- Clearly identify the 'call-up' contract amount, and the fee billed to date against that contract amount;
- Clearly identify the call-up number on their invoices

To ensure good project communication, it is recommended that SOA firm advise the NCC Project Manager when 75% of the purchase order costs have been incurred.

The NCC will hold back 15% of the contract value for incomplete work such as: final and "as-built" files; editable text files; and complete commissioning documentation including the provision of linked photographic files. All files must be named in accordance with the predefined file naming format.

TERMS OF REFERENCE

OPERATION AND MAINTENANCE OF THE HOG'S BACK SWING BRIDGE OWNED BY THE NATIONAL CAPITAL COMMISSION

NCC TOR No. NR60

July 2013

NCC Tender File No.NR60

The National Capital Commission (NCC) is seeking tenders for the delivery of operations and maintenance management services of the Hog's Back Swing Bridge in the National Capital region. The contract is for a five **(5)** year period beginning **upon contract award.**

The scope of work will include the maintenance, operation and emergency servicing of the electrical and mechanical systems that are essential for the operation of the sewage ejector systems. The NCC will continue to provide planning and overall management of the assets.

The NCC is requesting tenders with the objectives of supporting high standards of service and excellence at competitive prices. The NCC believes that this tender call will result in a successful contract award; however, in the event that tenders submitted do not meet these basic objectives, the NCC will not proceed with contract award and will implement alternative service delivery approaches.

Ce document est aussi disponible en français.

NCC CONTACT:

Nathalie Rheault

Senior Contract Officer

3rd Floor

202 – 40 Elgin Street

Ottawa, Ontario

K1P 1C7

Phone: 613-239-5678 ext. 5080

Fax: 613-239-5007

nathalie.rheaultmailto:@ncc-ccn.ca

The detailed response to the TOR, including without limitation, all mandatory requirements, shall be received no later than September 5, 2013 at 3:00 p.m. Ottawa time at the 3rd floor Service Centre, 40 Elgin Street, Ottawa, Ontario, K1P 1C7.

NOTICE

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NOTE: Contractors must have experience with the pumps, components and systems identified in the TOR. Technical specifications are provided here for reference purposes only and in the language in which the Manufacturer distributes them.

SECTION 1 - INTRODUCTION

1.0 CONTEXT

The Urban Lands and Transportation (ULT) division of the NCC manages the natural and built facilities and assets in the Nations Capital. The Division protects and manages these assets with the objectives of providing a safe and enjoyable experience for all users.

Effective maintenance and lifecycle management is required for a diverse mix of urban assets, from urban conservation areas to naturalized meadow parkways, downtown parks and a variety of fixed assets. The overall objectives of the NCC are to ensure public health and safety, to protect and preserve assets, the environment and to provide for an enjoyable experience. The NCC is committed to planning, developing and implementing all of its programs and activities in a manner designed to minimize adverse effects on the environment and to enhance the environmental resources under its responsibility.

The National Capital Commission (NCC) is the owner of the Rideau Canal Hog's Back Road Swing Bridge. The bridge is operated by Parks Canada from May to October. As the owner of the bridge, the NCC is responsible for the regular preventive maintenance of the bridge's structure and systems as well as for the provision of emergency repair services. The NCC is proceeding with a tender to retain the services of a contractor competent in the fields of mechanical, electrical and hydraulic systems for the Operation and Maintenance of the Hog's Back Swing Bridge. The service contract will be for a period of five (5) years beginning upon contract award.

The contractor will be responsible for all planned maintenance including spring start-up and fall shut down, weekly and monthly inspections as well as for emergency servicing during the bridge operational season. The contractor will be responsible for providing the NCC representative with written recommendations for improvements and repairs.

The map provided on the following page indicates the geographical locations of the Hog's Back Swing Bridge that form part of this Contract.

1.1 SCOPE OF WORK AND DURATION

The NCC is proceeding with a tender to retain the services of a contractor competent in the fields of mechanical, electrical and hydraulic systems for the Operation and Maintenance of the Hog's Back Swing Bridge. The service contract will be for a period of five (5) years beginning upon contract award.

The Contractor will be responsible for all Operation and Maintenance described in this Contract, including spring start-up and fall shut down (Preventive Maintenance), regular inspections and testing (Predictive Maintenance) and emergency servicing (Reactive Maintenance).

SECTION 1 - INTRODUCTION

1.2 CONTRACTOR'S OBLIGATIONS

The Contractor agrees to take any and all steps required to fulfill his obligations under this Contract and to comply with the terms of this Contract at all times, completely and faithfully at his cost. The scope of the Contract is established by the body of services required in each section. The Contractor shall perform all work required to fulfill the obligations of this Contract in accordance with all industry standards. The Contractor will ensure that he provides the services required in each section of this Contract even though individual tasks are not all specifically identified, but are required to provide the services requested. Furthermore, the Contractor shall be responsible for any costs resulting from the absence or lack of Predictive, Reactive and/or Preventative Maintenance on his/her part.

1.3 CONTRACT BOUNDARIES

The Contractor shall provide all services within the geographic boundaries as summarized on the map below.

SECTION 1 - INTRODUCTION

SECTION 1 - INTRODUCTION

1.4 NCC RESPONSIBILITIES

The NCC is responsible for:

1. Ensuring that all contractual obligations are continuously met by the Contractor.
2. Providing a Contract Management Officer (CMO) for this Contract who shall be the Contractor's principal contact at the NCC.
3. Providing a 24 hour/7 day a week emergency telephone service.
4. Making timely decisions that facilitate the Work to be delivered by the Contractor.
5. Providing plans and specifications where and when available.
6. The NCC CMO will be the only liaison with other stakeholders of the bridge that includes the public, Parks Canada, local transportation authorities, the media and local fire and police departments.

SECTION 2 – TYPICAL TERMS AND CONDITIONS

2.0 DEFINITIONS

In this Contract, the following words, when presented with the first letter in upper case shall have the corresponding meaning:

"**Act**" means the National Capital Act, R.S.C. 1985, c. N-4 as amended and the regulations enacted thereunder.

"**Applicable Laws**" means, at any time, with respect to any Person, property, transaction or event, all then applicable laws, by-laws, statutes, regulations, treaties, judgements, decrees and (whether or not they have the force of law) all then applicable official directives, rules, consents, approvals, authorizations, guidelines, orders and policies of any governmental authorities or Persons having authority over any of such Person, property, transaction or event and includes all Environmental Laws.

"**Business Day**" means any Monday to Friday inclusive, statutory holidays in the Province of Ontario excepted. This definition applies to contract management, but is not applicable to the Work to be performed by the Contractor pursuant to this Contract.

"**Business Hours**" means the hours between 8 a.m. and 5 p.m. on any Business Day. This definition applies to contract management, but is not applicable to the Work to be performed by the Contractor pursuant to this Contract.

"**Component**" means a part of an asset which represents not more than 50% of the total Replacement cost of the entire asset. This includes, but is not limited to, items such as control panels, motors, pumps, etc.

"**Condition based monitoring**" or "**CBM**" means observing and reporting (monitoring, testing, etc.) the state of a system and its Components in order to determine when/if Maintenance is actually necessary.

"**Conservation Officer**" means an NCC employee with peace officer status whose functions include law enforcement and public safety.

"**Consumables**" means products that are routinely used up and purchased while a system is in operation and are intended for recurrent replacement as recommended by the original equipment manufacturer and/or industry best practices. These items include but are not limited to: gaskets, rings, seals, sealants, tapes, adhesives, lubricants, motor oil, pipe thread compounds, cleaners, screws, bolts, washers, clamps, small electrical connectors, fuses, lamps, etc.

"**Contract**" means the contract entered into between the Successful Proponent and the NCC, incorporating, with such changes as may be required by the context, all of these Terms and Conditions, pursuant to which the Successful Proponent agrees to perform all of the specific services in accordance with the standards of performance set out in the Contract and other matters arising out of the successful tender and accepted by the NCC, if any.

SECTION 2 – TYPICAL TERMS AND CONDITIONS

"**Contract Management Officer**" or "**CMO**" means an NCC employee or delegate whose function is to monitor the Contract on behalf of the NCC.

"**Contractor**" is synonymous with Successful Proponent.

"**Emergency Communication Services**" means, depending on the context, the NCC 24-hour Emergency Communication Service (24 HECS) available 365 days/year at 613-239-5353.

"**Employees of the Contractor**", "**Contractor's Employees**", "**Personnel of the Contractor**" and "**Contractor's Personnel**", whether in upper or lower case, all mean any person employed by the Contractor and include dependent contractors and any subcontractors of the Contractor as well as their employees.

"Environmental Laws" means:

- all federal, provincial, regional or municipal statutes and regulations with respect to environmental or occupational health and safety matters as they may be amended or replaced from time to time;
- the jurisprudence with respect to environmental law and health and safety law; and
- all environmental assessment procedures, rules, ordinances, policies (including, but not limited to, the NCC Environmental Protection Policies Statements set out in Appendix 2-D), guidelines, orders, approvals, notices, permits, judgements, directives, licences, decisions and requirements, with or without force of law, as they may be amended or replaced from time to time.

"**Equipment**" means all tools and machinery that shall be provided by the Contractor in order to fulfil the requirements of the Contract.

"**Event of Insolvency**" means any of the following events:

- if proceedings are instituted by or against the Contractor to cause it to be wound up, dissolved, liquidated and, in the case where such proceedings are instituted against the Contractor, the Contractor acquiesces in such proceedings, or the Contractor has its existence terminated or has any resolution passed therefore, or makes a general assignment for the benefit of its creditors or a tender under any legislation dealing with insolvency or bankruptcy, or is declared bankrupt or insolvent, or files a petition or answer seeking a reorganization, arrangement, composition, readjustment, liquidation, dissolution or similar relief for itself under any present or future law relating to bankruptcy, insolvency or other relief for or against debtors;
- if a court of competent jurisdiction enters an order, judgement or decree approving a petition or proceedings filed against the Contractor seeking any reorganization, arrangement, composition, readjustment, liquidation, dissolution, winding up, termination of existence, declaration of bankruptcy or insolvency or similar relief under any present or future law relating to bankruptcy, insolvency, or other relief for or against debtors; or

SECTION 2 – TYPICAL TERMS AND CONDITIONS

- if a trustee in bankruptcy, receiver and manager, liquidator, administrator or any other officer with similar powers is appointed for the management of all or any substantial part of the property of the Contractor.

"**Fixed Fee**" means the dollar amount per annum payable by the NCC to the Contractor for each Year of the Term of the Contract.

"**Force Majeure**" means any of the following events which (i) prevents the performance by the Contractor of its obligations pursuant to this Contract, and (ii) is not caused by and is beyond the control of the Contractor: acts of God, earthquakes, tidal waves, hurricanes, windstorms of extreme violence or intensity, other exceptional climatic condition of extreme violence or intensity, lightning, wars (whether declared or not), riots, insurrections, rebellions, civil commotions, sabotage, partial or entire failure of Utilities, strikes or other labour disruptions, shortage of and inability to procure labour, materials and supplies (after best efforts have been made by the Contractor to obtain replacements for such labour, materials and supplies) or orders, legislation, regulations and directives of any governmental authorities. With respect to: partial or entire failure of Utilities, strikes or other labour disruptions, shortages of and inability to procure labour, materials and supplies, or orders, legislation, regulations and directives of any governmental authorities, an increase in the cost on an annual basis of any such factor of less than twenty-five per cent (25%) compared to the amount budgeted for such factor in any approved payment schedule, or a delay of less than two weeks in the time for performance of any services required under the Contract, shall be deemed not to be, and shall not be claimed to constitute an event of Force Majeure.

"**Hourly Rate/Unit Price**" means cost allocated to the services described in Appendix 7-A (2) of the TOR to be provided by the Contractor in conformity with the standards of performance contained in this Contract.

"**Maintenance**" means any action taken to keep an asset in a state where it may be safely utilized for its designed or designated purpose. Notwithstanding the generality of the aforementioned, Maintenance also includes:

"**Predictive Maintenance**" means the application of Condition-based monitoring (see definition) or testing of assets for the purpose of early detection and elimination of equipment defects that could lead to unplanned downtime or unnecessary expenditures. Generally speaking, this type of Maintenance is conducted while the equipment is in normal operation, with little or no process interruption. The purpose of this type of Maintenance is to determine the condition of in-service equipment in order to predict when Maintenance should be performed.

"**Preventive Maintenance**" means all systematic, predetermined Work performed to a schedule with the aim of preventing the premature wear and tear or sudden failure of assets or Components. This type of Maintenance is proactive and usually involves the planned replacement of Consumables or Components based on specifications provided by the manufacturer and/or the NCC and/or as specified in this Contract. For the purposes of this

SECTION 2 – TYPICAL TERMS AND CONDITIONS

Contract, Preventive Maintenance shall include without limitation such activities as winter protection, regular inspections, start-up and shutdown of systems, spring clean-up, etc.

"**Reactive Maintenance**" means the Maintenance required after an event, malfunction or failure of an asset or a Component. This type of Maintenance is usually (but not exclusively) triggered by equipment failure and requires immediate response and action from the Contractor as defined in this contract.

"**National Capital Region**" (NCR) has the meaning ascribed thereto in the Act.

"**NCC**" means the National Capital Commission.

"**NCC Lands or Buildings**" means lands or buildings owned and maintained by the NCC..

"**NCC Records**" means any records in the custody of the NCC in existence on the commencement date of the Term, pertaining to the Subject Matter and all information, data and records prepared by the Contractor during the Term in relation to the Subject Matter and all reports of same including any correspondence, memorandum, book, plan, map, drawing, diagram, pictorial or graphic work, photograph, film, microfilm, sound recording, videotape, digitally recorded data, and any other documentary material, regardless of physical form or characteristics.

"**Non NCC Sites or Lands**" means lands maintained by the NCC but not owned by the NCC.

"**Operation and Maintenance (O&M)**" means the totality of services, materials, Components and Equipment provided by the Contractor in order to meet the requirements of this Contract.

"**Person**" means any individual, corporation, partnership, trust, other legal entity, other incorporated association or a government or political body.

"**Proponent**" means the party submitting a Tender in response to these TOR.

"**Tender**" means a tender submitted by a Proponent in response to the tender issued by the NCC that shall be subject to evaluation by the NCC for the purpose of selecting a Successful Proponent.

''Standing offer agreement'' (SOA) is an agreement by which a Contractor agrees to supply goods and/or services, as requested by the NCC, for a specific period of time, at prearranged prices and as per the applicable terms and conditions set out in the agreement.

"**Subject Matter**" means the fixed and portable assets and all duties and/or services related thereto, to be performed pursuant to the Contract.

"**Successful Proponent**" means the Contractor, if any, to whom the NCC has awarded the Contract.

SECTION 2 – TYPICAL TERMS AND CONDITIONS

"**Swing Bridge**" or "**Pivot bridge"** is a low bridge spanning a waterway which can be opened and closed to permit the passage of water vessels by pivoting horizontally at its pivot point.

"**Term**" means the period commencing upon award of contract and terminating March 31, 2018.

"**Terms and Conditions**" means the Contract and the expressions hereof, herein, hereto, hereunder, hereby and similar expressions referring to these Terms and Conditions; unless otherwise indicated, references to articles, sections and recitals are to articles, sections and recitals in these Terms and Conditions.

"**UPR**" means Unsatisfactory Performance Report. See Appendix 6-G

"**Work**" means the whole of the goods, services, materials, equipment, software, matters and things required to be done, furnished or performed by the Contractor with respect to the Subject Matter in accordance with the terms of this Contract.

"**Year**" means a period of twelve consecutive months during the Term extending from April 1st of one calendar year to March 31st in the next calendar year.

SECTION 2 – TYPICAL TERMS AND CONDITIONS

2.2 EXTENDED MEANINGS

2.2.1 GOVERNING LAWS AND FORUM

This Agreement shall be governed by, construed and interpreted in accordance with the applicable laws in force in the province of Ontario.

Any dispute arising out of this Agreement shall be subject to the exclusive jurisdiction of the courts of the province of Ontario (Canada).

2.2.2 CURRENCY

Except where expressly provided to the contrary herein, all monetary amounts in this Contract are stated and shall be paid in Canadian dollars.

2.2.3 SEVERABILITY OF PROVISIONS

Each of the provisions contained in this Contract is distinct and severable and a declaration of invalidity or unenforceability of any such provision or part thereof by a court of competent jurisdiction shall not affect the validity or enforceability of any other provision hereof.

2.2.4 ENTIRE CONTRACT

When duly executed by the Contractor and the NCC, the Contract shall constitute the entire Contract between the parties pertaining to the Subject Matter. There shall be no warranties, representations or agreements between the parties in connection with such Subject Matter except as specifically set forth or referred to in the Contract. All the provisions of the Contract shall be construed as covenants and agreements. Except as expressly provided in the Contract, no amendment, or waiver of any provision of such agreement shall be binding unless executed in writing by the party to be bound thereby. No waiver of any provision of the Contract shall constitute a waiver of any other provision and no waiver of any provision of such Contract shall constitute a continuing waiver unless otherwise expressly provided.

2.2.5 HEADINGS & TABLE OF CONTENTS

The inclusion of headings and table of contents in this Contract is for convenience of reference only and shall not affect the construction or interpretation of the provisions set out in this Contract.

2.3 ALTERATIONS

2.3.1 NCC TERMINATION RIGHT

SECTION 2 – TYPICAL TERMS AND CONDITIONS

Pursuant to section 40 of the Financial Administration Act, it is a term of every contract for the payment of any money by the NCC, that payment under the Contract is subject to there being a parliamentary appropriation for the fiscal year in which any commitment under the Contract is due and payable. If there is no parliamentary appropriation, the NCC shall have the right to deliver notice in writing to the Contractor terminating this Contract in its entirety and the NCC shall not be liable for any damages suffered by the Contractor as a result of such termination.

2.3.2 ALTERATIONS TO SCOPE OF CONTRACT

The NCC reserves the right to make alterations to any part of the Subject Matter at any time or times during the Term by delivery of notice in writing to that effect to be effective from the date stipulated which shall not be earlier than ten (10) Business Days after the deemed delivery date of the written notice.

2.3.2.4 WITHDRAWALS TO CONTRACT – GENERAL

In addition to 2.3.2 and in the event that the NCC elects to permanently or temporarily withdraw any site/service/activity/sub-activity, then the Contractor shall be relieved of any further rights or obligations hereunder in respect of such site/program/service/activity/sub-activity, including without limitation the right to recover any part of the Fixed Fee of the Contract that would otherwise have been payable to the Contractor in respect of such withdrawal. The Contractor acknowledges that should the NCC withdraw any site/program/service/activity/sub-activity, then the Contractor shall have no recourse or any entitlement to damages or any other remedies pursuant to this Contract or otherwise in respect of such decision made by the NCC.

2.4 CONTRACTOR'S OBLIGATIONS

See 1.2 and 1.3

2.4.1 PAYMENT SCHEDULE

The monthly allocation of the annual amounts for purposes of establishing the amount payable to the Contractor for any given month during the Term is subject to the review and approval of the NCC.

2.4.1.1 PREPARATION OF PAYMENT SCHEDULE

The Contractor agrees to prepare and submit a monthly invoicing schedule to the NCC. Once approved by the NCC, the schedule will apply to all invoices for the regular O&M services contained in Appendix 7-A(1). Invoices received by the NCC, once validated and approved, will be paid within 30 days..

2.4.1.3 APPROVED PAYMENT SCHEDULE UNAMENDABLE

SECTION 2 – TYPICAL TERMS AND CONDITIONS

Upon receipt of NCC approval of the payment schedule, the allocation of the amounts set out therein shall be fixed for the relevant Year of the Term unless amended as per the permitted alterations to the scope of the Contract (see 2.3.2).

2.4.1.4 LIMITATION ON NCC FINANCIAL OBLIGATIONS

The NCC shall have no obligation, and the Contractor shall not represent to third parties that the NCC has any such obligation, on account of reimbursement of expenses, overhead costs, administrative expenses, or salaries and benefits of employees, except to the extent that such amounts are included in amounts payable pursuant to the payment schedule.

2.4.1.5 HOLDBACK ON FINAL PAYMENT

Upon the expiry or earlier termination of the Term, the NCC shall withhold 50% of the final payment due. The said holdback shall be returned to the Contractor once a physical inspection of Contract assets confirms that they are returned in a condition satisfactory to the NCC.

2.4.1.6 DIRECT DEPOSIT

Payments by direct deposit are presently available to all companies doing business with the NCC. Should your firm be awarded a contract with the NCC and be interested in this method of payment, a completed "SUPPLIER – DIRECT PAYMENT AND TAX INFORMATION FORM" will be required prior to award of contract.

2.4.3 CONDITIONS COMMON TO PERFORMANCE OF ALL MAINTENANCE DUTIES

In addition to the obligations imposed in 2.4.1, the Contractor agrees that it shall comply with each of the following conditions:

2.4.3.1 PERMITTED USES

The Contractor shall not, without the written approval of the NCC, use any part or parts of the Subject Matter or permit them to be used in whole or in part for any purpose or purposes other than those approved by the NCC.

2.4.3.6 DUTY TO ACT IN GOOD FAITH

The Contractor shall act diligently, efficiently, in good faith, in conformity with the requirement of insurers and in accordance with the standards applicable to a prudent owner in performing the duties and services required of it hereunder.

2.4.3.7 WARRANTY

The Contractor warrants that it is competent to perform the Work required under this Contract in that it has the necessary qualifications including, without limitation any licensing or certification requirements imposed by the applicable laws as well as the knowledge, skill and ability to perform the Work.

SECTION 2 – TYPICAL TERMS AND CONDITIONS

Any work and/or service provided by the Contractor must be consistent with the established and generally accepted standards for supplies and services of the type covered by this Contract, in full compliance with the requirements and free from defect in material and workmanship. The Contractor agrees that this warranty shall survive the acceptance of and payment for the Work and agrees that the Contractor's obligation under it includes repairing or replacing any part or parts thereof which shall, within twelve (12) months from the date of delivery or date of completion of the Work, become defective as a result of faulty design, material or workmanship.

2.4.3.8 COMMITMENTS MADE IN CONTRACTOR'S TENDER

In addition to the obligations contained in this Contract, the Contractor hereby undertakes to fulfil the commitments made in its Tender which is incorporated by reference into this Contract. If there are any inconsistencies between the terms and conditions of this Contract and those set out in the Tender, the document containing the most extensive obligations on the part of the Contractor shall prevail.

2.4.3.10 SECURITY RISKS

The Contractor shall ensure that none of the Employees of the Contractor and others for whom the Contractor is responsible and who are to perform the Contractor's obligations under this Contract constitute a security risk and shall ensure that all Employees of the Contractor and others for whom the Contractor is responsible who are to perform the Contractor's obligations under this Contract complete the NCC's security screening process in order that the NCC may obtain a security assessment of that person before accessing any site included in this Contract. The security requirements are more specifically described in 2.15.15.

2.5 CONTRACTING

2.5.1 LIMITATIONS ON CONTRACTING AUTHORITY

The Contractor shall not have, and shall not represent that it has, the authority to pledge the credit of the NCC nor purport to create any security interest in any property of the NCC in favour of a third party.

2.5.1.2 PROHIBITION

The Contractor shall not incur any expenditure or enter into any contract on behalf of the NCC except on an arm's length basis.

2.5.2 SUB-CONTRACTING

The Contractor shall advise the NCC of any part of the Work that it wishes to subcontract prior to contracting for such Work and shall allow the NCC to review the terms of reference for such contract. If the scope of Work identified in the terms of reference for such contract or any other part of such contract is not satisfactory to the NCC, the Contractor shall make

any modifications that the NCC requires. Any subcontractor used by the Contractor for the purpose of providing services hereunder shall respect all requirements of this Contract.

2.6 TREATMENT OF PAYMENTS & RECEIPTS

2.6.1 TREATMENT OF PAYMENTS

2.6.1.1 LIABILITY FOR FIXED FEE

The only amount which the NCC shall be obliged to pay to the Contractor or otherwise in respect of the obligations created by this Contract is the Fixed Fee of the Contract stipulated in the tender submitted by the Successful Proponent and accepted by the NCC subject to any other amounts mutually agreed upon by the parties.

2.6.1.2 MANNER OF PAYMENT TO CONTRACTOR

Provided that the Contractor is not in default hereunder and subject always to the provisions dealing with set-off or withholding of payments and the provision of 2.6.1.3 below, the NCC shall pay to the Contractor the pertinent monthly amounts set out in the payment schedule approved pursuant to 2.4.1.3 on a thirty day net basis for the work performed in the previous month.

2.6.1.3 DEDUCTION WHERE SERVICES OMITTED OWING TO FORCE MAJEURE OR DEFAULT

Notwithstanding the provisions of 2.6.1.2, in the event that any of the Contractor's obligations hereunder are not performed because of the occurrence of an event of Force Majeure or default, then there shall be a corresponding deduction from the Fixed Fee of the Contract.

2.6.2 OBLIGATION TO VACATE LIENS

The Contractor covenants that it shall not, during the Term, permit any construction lien to be, or to remain registered against the title to any lands included in the Subject Matter by any of its contractors or subcontractors by reason of work, labour, services or material supplied or claimed to have been supplied to the Contractor or to anyone using any part of the Subject Matter through or under the authority of the Contractor. The Contractor shall take all steps necessary to cause any construction lien to be discharged or vacated, as the case may be, at the Contractor's sole expense within thirty (30) days of receiving notice that such lien has been registered, except where such construction lien has arisen in respect of Capital Works that have been performed by third parties pursuant to 2.4.2. Nothing herein shall prevent the Contractor from contesting any liability to a Person for any claim for lien or the validity of any construction lien.

SECTION 2 – TYPICAL TERMS AND CONDITIONS

2.7 ACCOUNTING & REPORTING REQUIREMENTS

2.7.1 MAINTENANCE OF OFFICE & RECORDS

The Contractor shall keep and maintain at the head or branch office of the Contractor, in the National Capital Region, full and complete information, data and records of its activities and all financial transactions related to the management and operation of the Subject Matter.

2.7.2 OWNERSHIP & ACCESS

All information, data and records prepared by the Contractor during the Term in relation to the Subject Matter, and all reports of same shall be the property of the NCC. The NCC shall have the right at any time or times during the Term and thereafter to unrestricted access to all such information, data, records and reports.

2.7.7 NCC RECORDS

2.7.7.1 OWNERSHIP

The NCC retains ownership of all NCC Records during the Term. For the purpose of clauses 2.7.7.1 to 2.7.7.7, the term "Records" will have the same meaning as is ascribed to the term "Record" in section 1 of the Access to Information Act, R.S.C. 1985, c. A-1, as amended.

2.7.7.7 RETURN OF NCC RECORDS ON TERMINATION

On the expiry of the Term or earlier termination of the Contract, the Contractor shall return the NCC Records, updates thereto, all original leases or agreements and all other documents created during the Term to the custody of the NCC.

2.10 INDEMNITIES

2.10.1 UNCONDITIONAL OBLIGATION TO PERFORM

The Contractor covenants and agrees to take, or cause to be taken, such action as may be necessary to cause the Contractor, at all times fully and faithfully, to perform and discharge its obligations under this Contract and each part hereof, and to comply with the Terms and Conditions hereof.

2.10.2 LIABILITY FOR PAYMENTS

The Contractor shall duly perform and observe each and every covenant, proviso or condition in this Contract on the part of the Contractor to be performed and observed, including any and all payments agreed to be paid or payable under the Contract, on the days and at the times and in the manner herein specified. If any default shall be made by the Contractor, in payment of any sums from time to time falling due hereunder as and when the same become due and payable, or in the performance or observance of any of the

covenants, provisos or conditions which under the terms of the Contract are to be performed, observed or kept by the Contractor, then the Contractor shall forthwith pay to the NCC on demand such sums in respect of which such default shall have occurred and all damages that may arise in consequence of the non-observance or non-performance of any of the said covenants, provisos, or conditions.

2.10.3 FORBEARANCE NOT TO CONSTITUTE ESTOPPEL

No neglect or forbearance of the NCC in endeavouring to obtain payment of any amount required to be made under the provisions of the Contract as and when the same become due, no delay of the NCC in taking steps to enforce performance or observance of the several covenants, provisos or conditions contained in the Contract to be performed or observed by the Contractor, no extension or extensions of time which may be given by the NCC from time to time to the Contractor, and no other act or failure to act of or by the NCC shall release, discharge or in any way reduce the obligations of the Contractor hereunder.

2.10.4 INDEMNITY SURVIVES DISCLAIMER OR OTHER DETERMINATION

(This section is only applicable if the NCC requests an indemnifier)

In the event of a determination of this Contract other than by a mutual release in writing between the NCC and the Contractor, or in the event of the determination of this Contract by reason of bankruptcy or by reason of any statutory provision similar thereto, or in the event of a disclaimer of the Contract pursuant to any statute, then the Indemnifiers, at the option of the NCC, shall forthwith execute a new Contract between the NCC as owner and the Indemnifiers as Contractor in respect of the liabilities and obligations that remain unperformed at the date of such termination or such disclaimer. Such Contract shall contain the same owner and Contractor obligations respectively and the like covenants, provisos, agreements and conditions in all respects (including the rights of termination) as are contained in the Contract.

2.10.5 PRIMARY LIABILITY

(This section is only applicable if the NCC requests an indemnifier)

The Indemnifiers are primarily liable, jointly and severally, with the Contractor and not as mere sureties or guarantors. The Indemnifiers shall not be released nor will their liability hereunder be limited or lessened by the NCC granting time, taking or giving securities, accepting tenders, or by time being given to the Contractor, or by any amendment of this Contract, or by any compromise, arrangement, composition or plan of reorganization affecting the Contractor or the Indemnifiers, or by release of any party liable directly as surety or otherwise, or by failure to declare a default under this Contract, or by any dealings whatsoever between the NCC and the Contractor, or by or with any other parties or Persons whomsoever, or by any other act, omission or proceedings in relation to this Contract whereby the Indemnifiers might otherwise be released or exonerated or the liabilities and obligations of the Indemnifiers hereunder effected. The Indemnifiers hereby expressly waive

notice of the granting of time, the taking or giving of securities, and any other matter whatsoever referred to in this Contract. No waiver by the NCC of any rights under this Contract shall be effective unless in writing and no such waiver shall be taken in any manner whatsoever to affect those rights or any other rights, except as expressly so provided in such waiver, and only for such time periods as are provided in such waiver. Nothing except for the performance of all obligations of the Contractor and the Indemnifiers under or contained in this Contract will discharge the Indemnifiers.

2.10.6 NO OBLIGATION TO EXHAUST OTHER REMEDIES

(This section is only applicable if the NCC requests an indemnifier)

The NCC shall not be bound to have recourse to or exhaust its recourse against the Contractor, or in respect of the Letter of Credit, letter of guarantee, performance bond or otherwise before enforcing the NCC's rights against the Indemnifiers under clauses 2.10.4 and 2.10.5. If there be more than one Indemnifier, the obligations of the Indemnifier under clauses 2.10.4 and 2.10.5 shall be joint and several.

2.10.7 INSURANCE

2.10.7.1 MINIMUM COVERAGE

The Contractor shall purchase, provide and maintain in force throughout the Term insurance in the following amounts and containing at least the following endorsements:

Liability Insurance:

Minimum Amounts of Coverage Required:

$5,000,000 per occurrence

Endorsements:

- Premises and operations
- Broad form products and completed operations liability
- Broad form property damage
- Personal injury
- Blanket contractual liability
- Occurrence coverage
- Non-owned automobile, including contractual
- Contingent employers liability
- Employees as additional insured's
- Cross liability
- Severability of interests
- Employers Liability

SECTION 2 – TYPICAL TERMS AND CONDITIONS

The insurance policy must cover all activities and/or services that are to be performed by the Contractor to respect its obligations under this Contract. The policy must also include a deductible portion not to exceed $5,000 and the policy must satisfy the NCC in all respect.

2.10.7.2 ASSIGNMENT OF INSURANCE

The Contractor shall have the right to assign its interest in all such insurance to any secured lender. Without limiting the foregoing, any such assignment shall be subject to the requirements of this Contract.

2.10.7.3 PREMIUMS

The Contractor shall duly and punctually pay all premiums and other sums of money payable for maintaining the insurance required hereunder.

2.10.7.4 NON-CANCELLATION

Each of the policies for such insurance required herein shall contain a condition to the effect that the insurer shall not cancel such policy or materially alter the coverage afforded by such policy except after sixty (60) Business Days prior written notice to the NCC. The Contractor covenants not to do anything, omit to do anything, or permit anything to be done, or omitted to be done, which shall invalidate, adversely affect or limit any insurance policy referred to herein.

2.10.7.5 EVIDENCE OF INSURANCE

The Contractor shall, concurrently with the execution of the Contract and each subsequent March 15 during the Term and at other times upon the request of the NCC, provide certified copies of the policies of insurance and certificates of insurance required under this Contract as well as satisfactory evidence that such policies are in full force and effect (see 6.1.3).

2.10.7.6 ACKNOWLEDGEMENT OF RELEASE BY CONTRACTOR OF CLAIMS & INDEMNITY

The Contractor hereby releases the NCC, its servants, agents, and those for whom the NCC is in law responsible, from all liabilities, claims, actions, damages, loss and expenses arising out of the Contractor's negligence. The parties acknowledge that the Contractor has agreed that the NCC shall not be liable or responsible in any way for any injury or death to any person or for any loss or damage to any property at any time in, on or related to the Subject Matter, arising out of the Contractor's negligence.

2.10.7.7 ADDITIONAL INSURED'S

All insurance policies to be maintained by the Contractor hereunder shall include the NCC as an additional insured and shall contain a waiver of subrogation in favour of the NCC.

2.10.7.8 INDEMNITY

The parties acknowledge that both during and after the Term, the Contractor agrees to indemnify and save harmless the NCC, its successors and assigns, and all of its heirs and their servants, agents, employees and persons for whom they are responsible at law, in respect of any and all claims actions, causes of action, suits, debts, costs (including all legal fees and disbursements on a solicitor and his/her own clients basis), expenses, losses,

claims or demands whatsoever, at law or in equity arising out of the Contractor's negligence and related to the Subject Matter. The Contractor further acknowledges that every indemnity, exclusion of liability, and waiver of subrogation contained for the benefit of the NCC herein or in any insurance policy required to be maintained by the Contractor hereunder, or otherwise maintained by the Contractor, shall extend to and benefit all of the NCC's servants, agents, employees and other persons for whom the NCC is in law responsible.

2.10.8 CO-INSURANCE

If any policies of insurance contemplated in this Contract shall contain any co-insurance clause, the Contractor shall maintain at all times a sufficient amount of such insurance to meet the requirements of any such co-insurance clause so as to prevent the Contractor and/or the NCC from becoming a co-insurer under the Terms of such policy or policies and to permit full recovery up to the amount insured in the event of loss.

2.10.9 COVERAGE NOT AVAILABLE

Notwithstanding anything contained in 2.10, in the event that any specific obligation contained in 2.10 shall become obsolete or that insurance to meet such obligation is not available, then the Contractor shall obtain insurance providing for similar coverage which shall be satisfactory to the NCC acting reasonably. In the event the Contractor is unable or unwilling to provide such other similar coverage, then the NCC may obtain such other coverage and recover the cost thereof from the Contractor. If no such similar coverage is available, then a mutually agreeable replacement for such coverage shall be effected by the Contractor. Until the replacement policy is put into effect, the NCC may, at its risk and expense, place such coverage as it deems advisable and in the event, failing agreement, it is later determined by a court or other tribunal having jurisdiction that such coverage is reasonable, the Contractor shall reimburse the NCC the cost of such coverage.

2.10.10 EXCLUSION OF LIMITATIONS ON CONTRACTOR'S LIABILITY

The Contractor's liabilities and obligations shall not be restricted to any sums mentioned as minimums in any of the insurance clauses contained herein nor by any approval of the NCC pursuant to 2.10.9.

2.10.11 LIMITS OF INSURANCE

2.10.11.1 PERIODIC REVIEW

The required limits of insurance shall be reviewed at the request of the NCC and shall be increased at the NCC's request which request shall reflect current experience and appropriate indexing as deemed reasonable by a prudent owner.

SECTION 2 – TYPICAL TERMS AND CONDITIONS

2.12 PROHIBITION ON ASSIGNMENT

2.12.1 OUTRIGHT ASSIGNMENT PROHIBITED

The Contractor shall not assign any of its rights and benefits, or any of its duties or obligations hereunder or arising out of this Contract without the prior written consent of the NCC, which consent may be arbitrarily withheld. Every assignment or sub-contract, if any, shall incorporate all the Terms and Conditions of this Contract which can reasonably be applied thereto.

2.12.2 EXCEPTIONS

Notwithstanding the provisions of clause 2.12.1, the Contractor may assign its interest in the amounts to be paid by the NCC to the Contractor hereunder as security for a borrowing related to the financing of the activities contemplated herein. The right to give such assignment as security is subject to the Contractor being in good standing hereunder at the time of such assignment as security.

2.13 TERMINATION

2.13.1 TERMINATION

The Contract shall terminate on the expiry of the Term or any extension thereof provided that on the occurrence of an Event of Insolvency or any other default hereunder, the NCC, in addition to such other remedies that it may have hereunder or at law or in equity, may elect to terminate the Contract.

In accordance with section 40 of the Financial Administration Act, R.S.C. 1985, c.F-11, this Contract is subject to there being a parliamentary appropriation for the fiscal year in which a commitment is made under this Contract. If there is no parliamentary appropriation, the NCC shall have the right to deliver notice in writing to the Contractor terminating this Contract in its entirety and the NCC shall not be liable for any damages suffered by the Contractor as a result of such termination.

2.13.2 DELIVERIES ON TERMINATION

On termination:

a) The Contractor shall within fifteen days thereof deliver a final accounting to the NCC;
b) The Contractor shall immediately surrender to the NCC all NCC Records and keys;
c) The Contractor shall immediately return to the NCC all portable and operational assets, equipment and miscellaneous assets owned by the NCC together with an inventory of same;

d) The Contractor shall immediately return in good working order to the NCC all fixed assets owned by the NCC including any additions or replacements to such inventory.

2.13.3 RIGHTS ON TERMINATION

Any termination of the Contract shall release the parties from any further obligations hereunder except rights and obligations in respect of amounts owing, or to remedies with respect to any defaults or to matters with respect to which indemnities have been given hereunder.

2.14 DEFAULT PROVISIONS

2.14.1 DEFAULT

If the Contractor:

a) Fails to keep, perform or observe any of the covenants, agreements, conditions or provisions contained in this Contract that are to be kept, performed or observed by the Contractor and such failure continues for, or is not remedied within:

2 hours verbal notice for emergencies;

24 hours written notice for all others.

If the Contractor has recurrent failures related to the same activity, covenant, agreement, condition or provision of this Contract the NCC only needs to notify the Contractor of the first incident before having recourse to the default and remedy provisions set out in this Contract.

b) Suffers an Event of Insolvency;
c) Purports to make any transfer or assignment of this Contract other than in compliance with the terms of this Contract; or
d) Delays in the performance of one of a series of periodic services that result in a loss for the NCC of all or substantially all of the value attributable to such performance. (Where one of a series of periodic services is delayed, the eventual resumption of performance means that the Contractor's obligations have effectively been reduced with no corresponding savings to the NCC;

then the NCC shall have the following rights and remedies, which are cumulative and not alternative, and are in addition to and not in substitution for any rights or remedies that the NCC may have hereunder and/or pursuant to Applicable Laws:

i) To remedy or attempt to remedy any default of the Contractor under the Contract for the account of the Contractor. The NCC shall not be liable to the Contractor for any

loss, injury or damage caused by acts of the NCC in remedying or attempting to remedy such default and the Contractor shall pay to the NCC all expenses incurred by the NCC in connection with remedying or attempting to remedy such default, together with all of the NCC's reasonable administrative expenses;

ii) To recover from the Contractor all damages and expenses incurred by the NCC as a result of any breach by the Contractor;
iii) To terminate the Contract without further notice to the Contractor;
iv) To withhold, in whole or in part, any payments otherwise due to the Contractor hereunder until such default has been remedied;
v) To set-off from the Fixed Fee of the Contract an amount equal to the value of any obligations not performed or periodic obligations delayed by the Contractor;

2.14.3 REMEDIES GENERALLY

Mention in this Contract of any particular remedy of the NCC in respect of the default by the Contractor does not preclude the NCC from any other remedy in respect thereof, whether available at law or in equity or expressly provided for in this Contract. No remedy shall be exclusive of or dependent upon any other remedy, but the NCC may from time to time exercise any one or more of such remedies generally or in combination, such remedies being cumulative and not alternative.

2.14.4 EXTENDED MEANINGS

Unless otherwise indicated, references to articles, sections and recitals are to articles, sections and recitals in this Contract. Changes in grammar, gender, number and syntax required by the identity, structure or nature of the parties shall in all cases be assumed as though in each case fully expressed.

2.15 GENERAL PROVISIONS

2.15.1 NOTICE

Any notice or other communication required or permitted to be given hereunder shall be in writing and shall be given by priority post, personal delivery, facsimile transmission, or electronic mail as hereinafter provided. Any such notice or other communication, if delivered by post at any time other than during a general discontinuance of postal service due to strike, lockout or otherwise, shall be deemed to have been received on the fifth Business Day following the day on which the notice was sent, if personally delivered shall be deemed to have been received at the time it is delivered to the applicable address noted below either to the individual designated below or to an individual at such address having apparent authority to accept deliveries on behalf of the addressee, and if transmitted by facsimile transmission or by electronic mail on the next Business Day following the date of transmission. Notice of change of address shall also be governed by this section. In the event of a general discontinuance of postal service due to strike, lockout or otherwise, notices or other communications shall be personally delivered or sent by fax or e-mail and

shall be deemed to have been received in accordance with this section. Notices and other communications shall be addressed as follows:

a) if to the NCC:

National Capital Commission,

40 Elgin Street, Ottawa,

Ontario, K1P 1C7

Attention: Director, Urban Lands and Transportation

b) if to the Contractor: At the address and to the person specified in the Contractor's Tender.

The word "notice" in this paragraph shall be deemed to include any request, statement or other writing in these Terms and Conditions provided or permitted to be given by the NCC to the Contractor or by the Contractor to the NCC.

2.15.2 TIME OF THE ESSENCE

Time is of the essence of these Terms and Conditions and of the Contract.

2.15.3 JOINT & SEVERAL LIABILITY

If the Contractor comprises more than one Person, the liability of each such Person shall be joint and several.

2.15.4 TAXES & FEES

The NCC shall receive all benefit from input tax credits or rebates attributable to goods and services tax, Quebec sales tax and Ontario harmonized sales tax if applicable.

2.15.5 INFLATION

The NCC shall not allow for any revisions nor modifications to any of the Contractor's fees for reasons of inflationary cost increases.

2.15.7 PARAMOUNCY OF FEDERAL AUTHORITY

Notwithstanding anything contained in this Contract relating to any provincial or municipal statute, by-law, regulation or other enactment, the NCC hereby declares that no such reference shall be interpreted or implied as recognition by the NCC that the Province of Ontario, any municipality, or any other provincial or municipal statute, by-law, regulation or other enactment, has any jurisdiction over the NCC, or the Subject Matter, provided, however, that nothing in this section shall release the Contractor from compliance with any provincial or municipal law as it applies to the Contractor.

SECTION 2 – TYPICAL TERMS AND CONDITIONS

2.15.8 DENIAL OF PARTNERSHIP

It is understood and agreed that neither the provisions contained herein nor any acts of the parties hereto shall be deemed to create any relationship of agency, partnership, joint venture or common enterprise other than a contractual one. In all respects the Contractor is acting in its own capacity and all debts and liabilities to third parties incurred are and shall be exclusively for the account of the Contractor.

2.15.9 SUCCESSORS

The rights created by this Contract extend to the permitted successors and assigns of each of the NCC and the Contractor, and the liabilities created herein extend to and bind all successors and assigns of each of the NCC and the Contractor.

2.15.10 REPRESENTATION & WARRANTY REGARDING AUTHORITY

The NCC and the Contractor each represent and warrant to the other party that they have full right, power and authority to enter into the Contract and to perform its obligations thereunder.

2.15.11 ACCESS TO INFORMATION

The Contractor acknowledges that the NCC is subject to the provisions of the Access to Information Act (Canada) and may therefore be required to release information pertaining to these Terms and Conditions and the Contract which is the subject of a formal request under that Act and which is not exempt from disclosure under the provisions of that Act.

2.15.12 NO OFFER

No contractual or other rights shall exist between the NCC and the Contractor as a result of the negotiation of the Contract until all parties have executed and delivered the Contract, notwithstanding that the NCC may have delivered to the Contractor an unexecuted copy of the Contract. Such delivery shall be for examination purposes only and does not and shall not create any interest by the Contractor in these Terms and Conditions and the Contract, or raise any estoppel against the NCC. Execution of the Contract by the Contractor and its return to the NCC shall not create any obligation on the NCC, notwithstanding the lapse of any time interval, until the NCC has in fact executed and delivered the Contract to the Contractor.

2.15.13 DISPUTES

It is the non-binding intention of the parties that where a dispute arises between the parties in connection with the Contract, the parties shall attempt to resolve the dispute by negotiating in good faith and where possible by retaining an expert to help resolve the dispute, provided that failure to do so shall in no way affect the jurisdiction of an arbitrator to arbitrate such a dispute. Notwithstanding the intention of the parties to negotiate, any bona fide dispute or question arising over any of the provisions of the Contract, its

interpretation or effects shall be submitted to arbitration and not to any other forum. Any arbitration proceeding initiated in relation to these Terms and Conditions and the Contract shall be held in Ottawa, and in accordance with the provisions of the Commercial Arbitrations Act (Canada) as it may be amended from time to time, and any legislation in replacement thereof. The arbitrators shall determine the process of the arbitration having due regard to the intention of the NCC and the Contractor that the arbitration be completed as expeditiously as possible in all the circumstances. An award by the sole arbitrator or panel of arbitrators, as the case may be, shall be final and binding upon the parties. The parties will each pay 50% of the arbitrator's fee unless the arbitrator finds that one of the parties acted in bad faith throughout the arbitration process, in which case the arbitrator may determine how the payment should be apportioned between the parties.

2.15.15 SECURITY REQUIREMENTS

The NCC complies with Treasury Board's *Policy on Government Security* and consequently, it will require that the Contractor's employees submit to a personal security screening process (Security Clearance Form TBS/SCT 330-60E). The NCC may also perform a credit check when the duties or tasks to be performed require it or in the event of a criminal record containing a charge/offence of a financial nature.

The NCC reserves the right to not award the Contract until such time as the Contractor's employees have obtained the required level of security screening as identified by the NCC's Corporate Security. In this case the level of clearance required will be reliability.

The NCC also reserves the right to request that the Contractor submit to a *Designated Organisation Screening* and/or *Facility Security Clearance* – depending on the nature of the information it will be entrusted with. In the event that the Contractor does not meet the requirements to obtain the requested clearance, the Contractor shall take the corrective measures recommended by the Canadian Industrial Security Directorate (of PWGSC) or by the NCC's Corporate Security in order to meet these requirements. If no corrective measures are possible or if the Contractor fails to take the recommended measures, then the Contractor shall be in default of its obligations under this Contract and the NCC shall have the rights and remedies listed in section 2.14, including the right to terminate the Contract without further notice to the Contractor.

As part of their personal screening, individuals may be required to provide evidence of their status as a Canadian citizen or permanent resident as well as any other information/documentation requested by the NCC's Corporate Security in order to complete the screening. The NCC reserves the right to refuse access to personnel who fail to obtain the required level of security screening. The NCC reserves the right to impose additional security measures with respect to this Contract as the need arises.

The Contractor shall appoint one Company Security Representative (CSR) as well as one alternate (for companies who have more than five employees). Selection criteria for the CSR and the alternate are the following:

SECTION 2 – TYPICAL TERMS AND CONDITIONS

- They must be employees of the Contractor;
- They must have a security clearance (the NCC will process the clearances once the individuals have been identified).

Responsibilities of the Company Security Representative are as follows:

- Act as liaison between the NCC's Corporate Security and the Contractor to ensure coordination;
- In collaboration with the NCC's Corporate Security, identify the Contractor's employees who will require access to NCC information/assets as well as any recurring subcontractors (and their employees) who will require similar access and may not be supervised by the Contractor at all times during such access. Ensure that accurate and complete Personnel Security Screening documentation is submitted to the NCC's Corporate Security for the employees/subcontractors who have been identified;
- Ensure that employees/subcontractors, upon notification of having been granted a reliability status, sign the *Security Screening Certificate and Briefing Form* and return it to the NCC's Corporate Security;
- Ensure that only persons who have been security screened to the appropriate level and who are on a "need-to-know basis" will have access to information and assets;
- Maintain a current list of security screened employees/subcontractors;
- Ensure proper safeguard of all information and assets, including any information/assets entrusted to subcontractors;
- If a security incident or suspected breach of security occurs, prepare and submit to the NCC an occurrence report as soon as possible.

2.15.15.2 Occurrence Reports

In the event that any breach or suspected breach of security occurs, then the Contractor shall, in accordance with 6.1.10:

a) In emergency situations such as fire, accident, criminal activity, or serious injury or illness, advise the appropriate authorities of such event such as the fire department or the police; and
b) Forthwith after advising the appropriate authorities, provide a detailed written report of the occurrence to the NCC Conservation Officers and the CMO (see 6.1.10).

2.15.16 Tax Status of the National Capital Commission and Income Tax Requirements

2.15.16.1 Sales Taxes

The NCC is a federal crown corporation subject to Federal Goods and Services Tax (GST), Quebec Sales Tax (QST) and/or Ontario Harmonized Sales Tax (HST). These taxes are to be included in all prices quoted by the Contractor. Furthermore, each invoice sent to the NCC must provide and must show the price before taxes. The HST or the GST and QST must be added to each invoice or claim for payment and those taxes are to be shown separately on

the invoices. Concurrently, with the execution and delivery of the Contract, the Contractor shall provide the NCC with the Contractor's registration numbers.

2.15.16.2 INCOME TAX REQUIREMENTS

Pursuant to paragraph 221 (1) (d) of the Income Tax Act, the NCC must report on a T1204 supplementary slip payments made under services contracts (including contracts involving a mix of goods and services). The Contractor must provide the NCC with his/her tax account identifiers and supply all other information as requested by the NCC.

2.15.17 INSPECTION RIGHTS

The NCC shall have access at all times during the Term to all parts of the Subject Matter for the purpose of conducting inspections to ensure that all Maintenance duties are being performed in accordance with the Terms of the Contract.

2.15.18 FURTHER ASSURANCES

The parties covenant to execute and provide such further assurances as may reasonably be required to give effect to any provision of the Contract.

2.15.19 CONFLICT BETWEEN PROVISIONS

In case of any discrepancy whatsoever between parts of this Contract or, within a particular section of Parts I or II, the part containing the more extensive obligations on the part of the Contractor shall prevail.

2.15.20 LAWS, REGULATIONS, BY-LAWS

All Work pursuant to this Contract shall be performed in accordance with all existing and future federal, provincial and municipal laws, regulations and by-laws. The Contractor shall be responsible for any charges imposed by such laws, regulations and by-laws, and shall be unable to recover any amounts therefore from the NCC. Without limiting the generality of the foregoing, the Contractor shall be registered and comply with all regulations related to work place health and safety and worker's insurance. The NCC reserves the right to terminate this Contract if the Contractor does not have all the necessary permits and licenses for the execution of the Work. The Contractor shall also ensure that all Work accomplished to meet the requirements of this Contract is in accordance with the latest of the applicable codes and standards (especially Canadian Standards Association) and that any specialized work, such as electricity and plumbing be done by licensed workers.

2.15.22 NO BRIBES

The Contractor warrants that no bribe, gift or other inducement has been paid, given, promised or offered to any official or employee of the NCC for, or with a view to the obtaining of the Contract by the Contractor.

SECTION 2 – TYPICAL TERMS AND CONDITIONS

2.15.23 APPLICABLE TRADE CONTRACTS

This procurement is subject to chapter five of the Agreement on Internal Trade (AIT) and is considered excluded coverage, which is not subject to the North American Free Trade Agreement (NAFTA).

2.15.24 OCCUPATIONAL HEALTH AND SAFETY

In this contract, "OHS" refers to occupational health and safety.

2.15.24.1 GENERAL INFORMATION

2.15.24.1.1 With respect to the work to be performed under the terms of the Contract, the Contractor agrees and accepts to perform work equivalent or superior to the standards and best practices prevailing in the industry on the current date and/or to enforce observance of the said standards and best practices.

The Contractor acknowledges that neither the Contractor nor its employees are employees of the NCC or the Crown. Consequently, the Contractor is liable for all health and safety issues concerning its employees.

The Contractor acknowledges that it is responsible for the health and safety of persons on the site insofar as they are affected by the performance of the work, for the safety of property on the site and for the protection of persons adjacent to the site.

2.15.24.1.2 Without limiting the generality of the preceding sections, the Contractor acknowledges, agrees and accepts that it shall comply with the following provisions and that it is obliged to enforce compliance with the said provisions:

a) The provisions of the *Occupational Health and Safety Act* of Ontario and all related regulations, policies or guidelines issued under the said Act for work performed in Ontario;
b) The *Act Respecting Occupational Health and Safety* of Quebec and all related regulations, policies or guidelines issued under the said Act for work performed in Quebec;
c) The applicable provisions of the *Canada Labour Code,* Part II;
d) The laws regarding work standards in the province or provinces where the work is performed;
e) Management and disposal of contaminated soils as per applicable regulations and guidelines;
f) All policies or guidelines issued by the NCC relating to the Contract.

2.15.24.1.3 By entering into a contract with the NCC, the Contractor represents and warrants that it has reviewed and is aware of the obligations imposed by the legislative measures contained in subsection 2.15.24.1.2 above.

SECTION 2 – TYPICAL TERMS AND CONDITIONS

2.15.24.1.5 After being informed that its bid has been retained and prior to and as a condition of contract award, the Contractor shall, at its own expense, submit to the NCC its health and safety plan, including:

(a) Its health and safety plan for the work required under this Contract. This plan shall include, but shall not be limited to:

i. A list of known and/or foreseeable health and safety risks to which persons participating in the work may be exposed because of the nature, location or method of performing the work;
ii. For each identified risk, the control measures the Contractor intends to take (including work organization, job hazard analysis, safe work method and work supervision);
iii. The list of regulatory safety materials, equipment, devices and clothing required because of the nature, location or method of performing the work;
iv. Instructions indicating when and how the above-mentioned regulatory safety materials, equipment, devices and clothing must be used;
v. Procedures for work involving contaminated soils;
vi. The Contractor's related training and communication plan;
vii. Its site inspection and equipment and vehicle preventive maintenance program;
viii. Its accident notification and investigation protocol.

NCC approval of the Contractor's OHS plan does not modify the Contract provisions relating to establishing responsibility for performance or non-performance of the OHS obligations. Notwithstanding the said approval, the Contractor must meet its obligations.

(b) The inventory of dangerous products and material safety data sheets for all products it intends to use;

(c) A clearance certificate from the Workplace Safety and Insurance Board (WSIB) and/or a confirmation of registration from the Commission de la Santé et de la Sécurité du Travail confirming that the Contractor is registered and that its file is in good standing.

2.15.24.1.6 Without restricting the scope of subsection 2.15.24.1.4 **prior to commencing work**, the Contractor must, at its own expense:

(a) Take all necessary precautions to bring health and safety risks to the attention of persons participating in the performance of the work and other persons admitted to the site or place of work;

(b) Supply the regulatory safety materials, equipment, devices and clothing to persons participating in the performance of the work and other persons admitted to the site or place of work;

(c) Ensure that persons participating in the performance of the work and other persons admitted to the site or place of work are familiar with the use of the regulatory safety materials, equipment, devices and clothing;

(d) Ensure that persons participating in the performance of the work are trained and competent in their field in order to control health and safety risks;

(e) Ensure that persons participating in the performance of the work and other persons admitted to the site or place of work are familiar with the relevant occupational health and safety policies and procedures of the NCC or other authorities.

2.15.24.1.7 It is understood that the Contractor shall not start work before satisfying the requirements of subsections 2.15.24.1.5 and 2.15.24.1.6. During the Term of the Contract, the Contractor must provide the NCC with up-to-date clearance certificates from the Workplace Safety and Insurance Board and/or certificate of compliance from the Commission de la Santé et de la Sécurité du Travail confirming that it is registered and that its file is in good standing. Such certificates shall be delivered every sixty (60) days in the case of Ontario and twice annually in the case of Quebec. If the Contractor does not provide up-to-date certificates the NCC may immediately terminate the Contract without notice and without contractual liability toward the Contractor.

2.15.24.1.8 For the purposes of subsections 2.15.24.1.4, 2.15.24.1.5 and 2.15.24.1.6, "regulatory" means determined in conformity with *Canada Labour Code* regulations.

2.15.25 STANDING OFFER AGREEMENT (SOA)

The Contractor must provide an Hourly Rate/Unit Price for Reactive Maintenance as indicated in Appendix 7-A(2). These Hourly Rates/Unit Prices must be representative of the calculations used in establishing the financial component of the tender where applicable. In the absence of provisions specifically dealing with a particular site or activity, these rates may be used as a basis to calculate any increase or savings resulting from additions, adjustments or deletions from this Contract (see 2.3 Alterations). In addition, the NCC intends to award a Standing Offer Agreement (SOA) to the Successful Proponent for the provision of additional services and Maintenance not specifically mentioned in the Contract. The SOA shall be based on the rates provided in the Hourly Rate/Unit Price form (see Appendix 7-A (2).

Note: Appendix 7-A (2) must be submitted in the Fee Tender envelope described in Section 7.

2.16 YEARLY ADJUSTMENT TO FIXED FEE OF CONTRACT

The NCC shall use the Consumer Price Index (CPI) to adjust on a yearly basis the Fixed Fee of the Contract. The Fixed Fee for the first Year of the Contract shall be the amount as provided by the Contractor and indicated in Appendix 7-A (1) and (2). For subsequent Years of the Contract, the Fixed Fee shall be established as follows:

SECTION 2 – TYPICAL TERMS AND CONDITIONS

2.16.1 YEAR TWO OF CONTRACT

The annual Fixed Fee (excluding taxes) for the second Year shall be based on the annual Fixed Fee (excluding taxes) during the first Year plus or minus a price adjustment based on the Consumer Price Index (CPI) – by city (monthly) All items for Ottawa-Gatineau (AIOG), specifically the percentage difference between the CPI – AIOG of August 2013 and August 2014, plus applicable taxes.

Example only:

CPI-by city (monthly) for Ottawa-Gatineau for August 2014 is 133.9.

CPI-by city (monthly) for Ottawa-Gatineau for August 2013 was 131.6.

% difference = ((133.9/131.6) x 100) - 100 = 1.7% increase

(decrease if % difference is negative)

2.16.2 YEAR THREE OF CONTRACT

The annual Fixed Fee (excluding taxes) for the third Year shall be based on the annual Fixed Fee (excluding taxes) established for the second Year plus or minus a price adjustment based on the Consumer Price Index (CPI) – by city (monthly) All items for Ottawa-Gatineau (AIOG), specifically the percentage difference between the CPI – AIOG of August 2014 and August 2015, plus applicable taxes.

2.16.3 YEAR FOUR OF CONTRACT

The annual Fixed Fee (excluding taxes) for the fourth Year shall be based on the annual Fixed Fee (excluding taxes) established for the third Year plus or minus a price adjustment based on the Consumer Price Index (CPI) – by city (monthly) All items for Ottawa-Gatineau (AIOG), specifically the percentage difference between the CPI – AIOG of August 2015 and August 2016, plus applicable taxes.

2.16.4 YEAR FIVE OF CONTRACT

The annual Fixed Fee (excluding taxes) for the fourth Year shall be based on the annual Fixed Fee (excluding taxes) established for the fourth Year plus or minus a price adjustment based on the Consumer Price Index (CPI) – by city (monthly) All items for Ottawa-Gatineau (AIOG), specifically the percentage difference between the CPI – AIOG of August 2016 and August 2017, plus applicable taxes.

SECTION 2 – TYPICAL TERMS AND CONDITIONS

Note: The Consumer Price Index (CPI) – by city (monthly) All items for Ottawa-Gatineau is available on Statistics Canada's website at http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/cpis02a-eng.htm,in table "Consumer Price Index by city (monthly) All items for Ottawa-Gatineau".

SECTION 3-GENERAL REQUIREMENTS

3.0 INTRODUCTION

This section identifies the general requirements of the Contract. These activities support the provision of services described in sections 4 (Operational Services) and 6 (Reporting) of the Contract.

3.1 EMPLOYEES

3.1.1 GENERAL

Any employee hired by the Contractor shall be fluent in one of the two official languages of Canada, respect all safety requirements and act in a manner that does not adversely affect the reputation of the Subject Matter and/or the NCC.

3.1.2 EXPERIENCE

The Contractor shall ensure that the following requirements are met and maintained by his/her employees for the duration of the Term of the Contract:

- Any person in a supervisory capacity shall have at least five (5) years experience in the areas relative to the Subject Matter of this Contract.
- Field employees shall have appropriate experience and skills to perform the duties of the Contract. New seasonal workers shall be supervised at all times by experienced employees.
- All employees must, when applicable, have appropriate safety training, security clearances and trade certifications (see article 2.15.15).

The Contractor shall ensure that he/she is able to demonstrate at any time to the NCC that he/she is in compliance with the experience requirements as indicated above by providing any and all proof of work experience for all of his/her employees.

3.1.4 WORK DRESS

All field employees of the Contractor shall be dressed, at the Contractor's expense, in a neat presentable fashion and wear approved safety equipment when required. All employees shall wear an appropriate standard uniform adapted to their area of activity with the company name prominently displayed..

3.1.5 REPLACEMENT OF EMPLOYEES

Any employee hired by the Contractor will be relieved of his/her duties and immediately replaced by the Contractor, if in the opinion of the NCC, this employee is unqualified or is acting in a manner contrary to the best interests of the NCC or if the employee does not meet the requirements stated above.

SECTION 3-GENERAL REQUIREMENTS

3.1.6 ART OF TRADE AND CERTIFICATION

Furthermore, the Contractor shall respect all trade certification when required by law.

Any work to be performed by the Contractor or by a subcontractor working on behalf of the Contractor must be done in accordance with the art of the trade and must follow any and all guidelines, requirements and specifications as set out by such trade.

The Contractor will operate in accordance with all federal, provincial and municipal codes and standards. Proper safety precautions must be exercised at all times, with extra precautions taken to protect the general public.

3.1.7 NCC REGULATIONS AND ENVIRONMENTAL GUIDELINES

The Contractor shall ensure its agents and employees are familiar with and comply with the NCC Environmental Guidelines and other specific directives relating to its facilities and services.

3.2 HOURS OF WORK

All applicable municipal by-laws with respect to hours of work, including those related to noise or other issues, must be followed except in emergency situations.

3.3 OFFICE IN NATIONAL CAPITAL REGION (NCR)

The Contractor shall use an office as a base of operation to provide all administrative/Maintenance management services required in this Contract. The office shall be fully operational for the start of the Contract (upon contract award) and remain as such throughout the duration of the Contract. It is strongly recommended that the Contractor provide a fully operational administrative office and work site located in the National Capital Region (NCR).

3.4 VEHICLES, MATERIALS & ASSETS

3.4.1 VEHICLES

The Contractor shall provide all vehicles required to fulfill the contractual obligations of this Contract. This includes any vehicles required for transportation purposes and/or for providing Maintenance services as requested in this Contract. The Contractor shall assume all risks inherent to the use of general or specialized vehicles. All vehicles used by the Contractor shall be kept in a clean and presentable condition, exempt of rust, and shall meet all provincial safety standards. The company name shall be prominently displayed on vehicles. Contractor vehicles shall be parked only in designated areas.

To the extent possible the Contractor will minimize unnecessary idling of vehicles which can result in the creation of greenhouse gases (refer to municipal by-laws). When replacing fleet

vehicles, the NCC encourages the Contractor to select energy efficient and environmentally responsible equipment (small pick-ups, 4-stroke motors, alternate fuels, etc.).

3.4.2 MATERIALS

3.4.2.1 STANDARDS

All materials and parts supplied by the Contractor must be new and conform to applicable standards of Canada Government Standards Board, Standards Council of Canada, Canadian Standards Association (CSA), Underwriters Laboratory of Canada (ULC), National Building Code. The Contractor shall not use an alternate type or lower quality material on any given site, nor shall the Contractor mix types or qualities of material on any site.

3.4.2.2 SUBSTITUTION

When the material to be used is in question and/or if the Contractor is unable to find materials and equipment identical to those specified or being replaced, the Contractor shall present samples to the NCC for prior approval.

3.5 MONITORING

3.5.1 MONITORING & EVALUATION

3.5.1.1 CONTRACTOR

The Contractor must identify a supervisor and/or foreman who shall be equipped with a cellular phone and a digital camera and be available to take all calls from the NCC, 24 hours a day, seven days a week for the duration of the Contract (note: supervisor "availability" does not entail "on-site availability" 24 hours a day, seven days a week).

3.5.1.2 CONTRACT MANAGEMENT OFFICER (CMO)

The NCC shall provide a Contract Management Officer (CMO) for this Contract who shall be the Contractor's principal contact at the NCC (see 1.4.1). The CMO shall make random inspections to ensure that all Contractual obligations are met. The CMO shall inform the Contractor of his/her observations. A formal evaluation shall be conducted twice yearly. The purpose of the evaluation is to identify areas of improvement.

3.5.2 UNRESOLVED OR RECURRENT ISSUES

In the case of any unresolved or recurrent issues, the NCC may at its own discretion record the matter on an unsatisfactory performance report (UPR; see Appendix 6-G). The Contractor shall respect and implement all recommendations indicated on the UPR to the full satisfaction of the NCC (for any unresolved or recurrent issues, the NCC may also wish to exercise its rights and remedies under the default clause – see 2.14).

The NCC reminds the Contractor of the importance of compliance with all of the performance standards associated with each of the required services outlined in the Contract.

SECTION 3-GENERAL REQUIREMENTS

3.6 COMMUNICATION DEVICES AND TECHNOLOGIES

The Contractor shall be required to provide as part of this Contract, all of the following communication devices: telephones, cellular phones, voice mail, fax machines, E-mail and digital cameras. The Contractor shall be responsible for purchasing all necessary equipment (including installation fees) and for all costs related to their use (including long distance charges). The cellular phone number shall remain the same for the entire Term and shall be given to the NCC upon contract award.

3.8 CHANGE OF DATES

The NCC may, at its sole discretion, change deadlines for any O&M requirements which are weather dependant, i.e.; the spring start-up. The NCC shall notify the Contractor in advance of any changes of deadlines. The Contractor shall modify his/her work plan accordingly and provide all O&M services respecting the revised deadlines as determined by the NCC.

3.9 EMERGENCY INTERVENTION

The Contractor will provide a 24 hour/7 days a week Reactive Maintenance service. The said service is described in detail in 4.7.1.3

3.10 PUBLIC SAFETY

The Contractor shall take all necessary precautions and/or measures to ensure that all work, activities or operations undertaken by the Contractor to fulfil the obligations of this Contract are accomplished in a manner that does not compromise public safety.

3.13 LOCKING DEVICES

The NCC has an established hierarchical lock and key system. At the beginning of the Contract, the NCC will provide the Contractor with three copies of each key required for the execution of the duties described in this Contract. The Contractor shall be responsible for maintaining, replacing and providing at his/her own expense any stolen or lost keys. The Contractor must also control the distribution of keys in his/her possession. To do so, the Contractor shall maintain a register (date, name, telephone number, number of keys and signature) of all employees, subcontractors and users to whom he/she has provided keys. The Contractor could be required to provide the said register to the NCC upon request.

3.16 DAMAGE CAUSED BY CONTRACTOR

3.16.1 GENERAL

SECTION 3-GENERAL REQUIREMENTS

The Contractor shall be responsible for any damages that it causes to NCC property. Any damage is to be reported immediately to the NCC on an occurrence report.

3.17 ENVIRONMENTAL REQUIREMENTS

The Contractor shall comply with all relevant federal, provincial and municipal environmental legislation. The Contractor shall also comply with the additional environmental requirements as listed in NCC Environmental Guidelines (Appendix 2-D). The Contractor will establish a response plan for toxic spills (see 6.1.8 for reporting). **This plan will be submitted to the NCC for approval within thirty days of Contract commencement**. Should there be a spill of toxic products (e.g. motor oil), the Contractor will immediately stop the further release of the contaminant, apply absorbent material to contain the spill and advise the NCC Emergency Service (24 hours) at 613-239-5353. The Contractor will be responsible for returning the contaminated site to its original condition according to NCC specifications. Any contaminated material will be removed and disposed of at an approved site outside of NCC Lands and an appropriate chain of responsibility document will be filed with the NCC.

3.22 MEDIA RELATIONS

The Contractor shall not act as a spokesperson for the NCC in dealing with the media. All requests for interviews or information on NCC matters made by the media must be forwarded to the NCC. The Contractor shall not give interviews without prior written approval from the NCC.

3.27 TRANSITION

The Contractor shall ensure a seamless transition at the beginning, renewal (if any), and termination of this Contract. Furthermore, the Contractor shall provide assistance to the future contractor as well as to the NCC by ensuring continued services during the transition period. The Contractor shall make himself available, at no additional cost to the NCC, until at least 60 working days after the termination of the Contract for any post evaluation reports, special meetings or other tasks requested by the NCC.

3.29 SITE ACCESSIBILITY

The Contractor shall provide assistance to any third party requiring access to any of the Lift station sites. In many cases, the type of assistance required is limited to opening and closing a site or facility to a third party. This entails dispatching one of his/her own employees to a designated location to allow access to personnel authorized by the NCC. The designated Contractor employee shall also close and lock the door once access is no longer required. In other cases, it also includes remaining on site with the third party until the work or the inspection is completed. The NCC shall provide reasonable notice to the Contractor. Most requests for access are during regular work hours.

SECTION 3-GENERAL REQUIREMENTS

SECTION 4-OPERATIONAL SERVICE REQUIREMENTS

4.0 OPERATIONAL SERVICE REQUIREMENTS

The objective of section 4 is to provide a detailed description of the O & M requirements of the Contract.

4.2 WORK STANDARDS

The Contractor agrees to use best practices and to comply with the Terms and Conditions of this Contract and with all applicable laws in effect during the Term. The Contractor shall perform all work required to fulfill the obligations of this Contract in accordance with all industry standards. Any work performed by the Contractor that does not respect the O & M requirements of Section 4 is considered non-compliant and constitutes an event of default under 2.14 of this Contract.

4.7 O&M REQUIREMENTS

The Contractor shall provide at his/her own expense O&M services to assets and Components as indicated in this section.

All work included in the O&M scope should be completed as proposed in the Work Plan and Schedule provided in Appendix "J". See also attached supporting documents for equipment overview and specifications.

4.7.1 WORK COMMONLY REQUIRED FOR ALL SITES;

4.7.1.1 PREVENTIVE MAINTENANCE

Annual Preventive Maintenance is performed once yearly during the month of April, or as scheduled by the NCC. This task is also sometimes referred to as the spring start-up.

Spring preparation and start up test of bridge must be completed prior to the start of the Rideau Canal navigation season (Mid-May). Parks Canada determines opening of navigation season. NCC will inform the contractor a minimum of 4 weeks prior to the Canal's scheduled opening date.

Annual Preventive Maintenance must include, but is not limited to testing, inspecting, cleaning, lubricating and maintaining the bridge and it's associated components as outline in the following section;

4.7.1.1.1 ANNUAL BRIDGE INSPECTION, WASHING, LUBRICATION AND MAINTENANCE

.1 Prior to the opening of the Navigation Season in Spring, the **entire** bridge will be washed by using a water pump capable of delivering a

SECTION 4-OPERATIONAL SERVICE REQUIREMENTS

stream of water at 100 to 125 pounds pressure. Before washing the following preparation is necessary:

Note: No pressurized cleaning will be done around the upper seal portion of the main support bearing. This will prevent water and debris from being forced down through the upper seal of the pivot bearing.

.2 Remove all accumulation of sand, soil and other debris from the bridge deck, center pier and abutments;

.3 Protect electric switches from water by wrapping them with a polyethylene sheet;

.4 Place the Swing Bridge Service Switch in the OFF position to guard against electric shock when spraying water on electrical components.

.5 The protective covering on hydraulic cylinder rods and the center pivot bearing housing, which was placed during winter lay-up, will be left on until completion of the washing;

.6 All balance wheels, loading wheels, wedges, wedge shoes and the spherical bearings on the four hydraulic cylinders will be lubricated to prevent the entry of contaminants during washing. Use M.P. (multi-purpose) grease for wheels, spherical bearings on hydraulic cylinders and wedge shoes. Use *Shell Natural HF-M46 Biodegradable* Oil for hydraulic. The importance of a thorough washing program for the preservation of structural steel cannot be overemphasized. Soil, sand and other debris, if allowed to accumulate, harbors moisture causing steel to rust away rapidly.

The bridge will be washed from the top, working downwards, washing off all sand, soil and other debris from the Irving deck, steel members such as I-beam, channel iron and angle iron flanges, shelves, pockets and especially the hidden area behind the bridge balancing concrete blocks that are affixed on the bridge chord. Washing will also include the centre pier and bridge abutments. The protective covering will then be removed from the hydraulic cylinder rods, electrical switches and center pivot bearing housing.

.7 The grease in the pivot bearing is to be pumped in, using a pneumatic grease dispenser, until it flushes out old grease and contaminants, through the upper vent tube. This grease is to be serviced yearly, in the fall.

The type of grease to be used is SHELL SRS-2000 (summer grease).

Note: The grease will be completely replaced every 6-8 years by the NCC.

SECTION 4-OPERATIONAL SERVICE REQUIREMENTS

The oil in the reservoir of the hydraulic power unit will be drained, the reservoir cleaned and refilled to correct level with clean hydraulic oil, Shell *Natural HF-M46 Biodegradable* Oil. Replace cartridge of filler breather. Replace suction filter element once or more if called for by the vacuum indicator. Check ML 360 Life – Light vacuum indicator once a month. This visual vacuum indicator show pump inlet conditions as follows:

- Bright Yellow Sleeve showing; Normal vacuum conditions;
- Partial Red showing; Changing vacuum conditions;
- All Red showing; full vacuum condition, a warning of need to change suction filter. Once filter is serviced, but red still shows, then further maintenance is needed to prevent serious damage to pump, valves, cylinders, etc. (check reset button on top of vacuum indicator after filter change).

.8 A continuing drop in oil level in the power unit reservoir indicates an oil leak. Check line connections and hydraulic cylinder seals. Keep deceleration valve striker plates lubricated with general purpose grease.

4.7.1.1.2 ANNUAL TRAFFIC CONTROL EQUIPMENT – LUBRICATION AND MAINTENANCE

.1 Test all gate assemblies and ensure warning lights on the gate arms are operational and visible.

.2 The oil in the gear reducers of the traffic gates will be drained and refilled to correct level once every year - at Spring startup. For Western Railroad supply Type use SAE No. 30 machine oil and for the Western Cullen Div. Type use AGMA 30 transmission oil.

Various oil company equivalents for AGMA No. 7 oil:

Cities Services Oil Company	- Optimus Oil No. 10
Gulf Oil Corp.	- E.P. Lub. No. 15
Shell Oil Company	- Vitree Oil No. 71
Sun Oil Company	- Sunep No. 110

4.7.1.1.3 BRIDGE BALANCE TEST (EARLY MAY)

.1 Bridge balance test and balance adjustments to be conducted in conjunction with the NCC representative. NCC representative will provide testing procedure.

4.7.1.1.4 ELECTRICAL EQUIPMENT MAINTENANCE

SECTION 4-OPERATIONAL SERVICE REQUIREMENTS

.1 As part of the Spring start up perform the following verifications/tests and record the results on the "Record Sheets" provided in Appendix "C" [Sheets 1,2,3].

.2 Verify the operation of all electrical equipment with moving parts such as relays, magnetic starters, contactors, disconnect switches, push button stations, solenoid valves and circuit breakers. If there are any malfunctions the equipment should either be cleaned or replaced as required to ensure a safe and reliable operation. DO NOT OIL.

.3 Inspect all electrical contacts on equipment, such as relays, magnetic starters, contactors, disconnect switches, push button stations, proximity sensors and interlacing relays. If any of these contacts are burnt, replace them.

.4 Clean electrical contacts not needing replacement with an Ideal Flexible Abrasive Commutator Cleaner – Catalogue 82-001 or 82-006 from:

Irving Smith Ltd.
2095 Madison Avenue
Montreal, Quebec
or equivalent.

.5 Check all interlocking and overload relays to ensure that they are functioning properly.

.6 Make a visual inspection of all visible parts of buried cable runs. Inspect all electric components, such as electric motors, signal bells, traffic lights, directional solenoid valves, etc., for mechanical damage and record this damage. Report, in writing, all findings to NCC representative.

.7 Re-install proximity sensors

4.7.1.1.5 ELECTRIC MOTOR

.1 Motors with sealed bearings: these do not require lubrication and are to be replaced as per manufacturer's specifications.

.2 Motors that require grease as a lubricant; use only ball and roller bearing lubricant, type S.K.F., density M-3 or equivalent. Do not over-lubricate. Verify manufacturer's instructions on rating plate.

.3 Motors that require oil as a lubricant; use only good quality motor oil, SAE 10. Do not over-lubricate. Oil or grease will cause the motor windings to become clogged. See that all moving parts work freely. Verify manufacturer's instructions on rating plate.

.4 Measure the time, the voltage and the amperage - including starting and running values – for each of the following operations and record results on the Electrical Test Recording sheets (sample attached):

- Lowering/raising of traffic gates
- Drawing/driving of wedges
- Opening/closing of bridge

4.7.1.1.6 CABLE MEGGER CHECK

.1 Bridge circuits shall be meggered on a spot-check basis plus individual meggering of any circuits that have shown to be faulty by reports from the bridge master during the previous season.

.2 The results of the spring check-up will be recorded on the Electrical Test Recording sheets (samples attached, Appendix "C"), entering on these sheets the number of individual conductors tested.

.3 The reading from the Megger test will also be recorded with the conductor number.

As part of the annual Preventive maintenance, the Contractor must supply all Consumables required. The results and findings of the Predictive Maintenance must be communicated to the NCC in the form of a report, whose content and format are described in 6.1.7.

4.7.1.1.7 WINTER LAY-UP PROCEEDURE

The winter lay-up procedures described below must include, but is not limited to;

.1 CBM of all systems and Components.

.2 Winterizing of systems and Components, as per the manufacturers specifications or as per the directions given by the NCC.

.3 The bridge will be lubricated after the final operation at the end of the Navigation Season.

.4 The hydraulic cylinder rods will be covered by wrapping a polyethylene sheet securely around the exposed rods.

.5 The centre pivot bearing housing will also be securely wrapped up.

.6 Installation of stop plates to prevent wedges from creeping out.

.7 All electrical power will be shut down for the winter lay-up period.

.8 Remove all proximity sensors and store inside electrical room.

SECTION 4-OPERATIONAL SERVICE REQUIREMENTS

Although no written report is required as part of the winter lay-up, the Contractor must report to the NCC any findings which may affect the systems and Components at each location.

4.7.1.2 PREDICTIVE MAINTENANCE

Performed once monthly with no more than 30 days between inspections, Predictive Maintenance must include, but is not limited to, CBM of;

4.7.1.2.1 MONTHLY INSPECTION

.1 A complete inspection of the bridge must be carried out on a monthly basis as part of a preventive maintenance program. The following items should be verified:

.2 check Irving deck for loose rivets or fractured bearing bars;

.3 check and bleed air, if present, in the hydraulic system;

.4 check condition of flexible hydraulic lines and look for signs of oil leaks in line connections and hydraulic cylinder rod seals;

.5 check for any scrapes or damage to bridge railing by motor vehicles. Touch-up painting will prevent rusting;

.6 check that the clearance between track and balance wheels will be 1/8";

.7 check clearance between upper and lower loading shoes. Recommended clearance will be 1/32";

.8 take a sampling of the hydraulic fluid and conduct a condition analysis test on it monthly to monitor what contaminates are present and the condition of the fluid;

.9 report findings in writing to NCC representative.

4.7.1.2.2. Monthly Maintenance (May, June, July, August, September, October)

.1 All bearings fitted with grease cups or alemite fittings will be lubricated once a month with multi-purpose grease. Motors with sleeve bearings are to be oiled every three months with good quality of S.A.E. No. 10 motor oil. Do not over lubricate; excessive oil causes motor windings to become clogged. Motors' ball bearing assemblies are packed with grease at the factory. Old grease must be removed and new grease applied at least once a year. Use only ball

and roller bearing lubricant, type SKF density M-3 or equivalent. Verify manufacturer's instructions on rating plate.

.2 Test manual operation of the traffic gates with a hand crank. Carry out a "bridge wing test" by fully opening the bridge. While bridge is open, lubricate both lower loading shoes. Use Unirex EP 2 grease. Close bridge and record test in bridge log book. Al grease fittings on drive wedges will be fully greased.

4.7.1.2.3. Every Three Months (May, August, October)

.1 Every three months the spur gear teeth of the traffic gates must be given a light coat of suitable gear tooth lubricant, preferably a colloidal graphite solution, such as "Oildog". Caution: over greasing the gears on the Western Railroad Supply Type may cause brake failure which is located close to the gear train. Check brake.

The results and findings of the Predictive Maintenance must be communicated to the NCC in the form of a report, whose content and format are described in 6.1.9

4.7.2 TRAFFIC CLOSING OF THE BRIDGE TO FACILITATE PREVENTIVE AND OR PREDICTIVE MAINTENANCE

.1 The NCC will be responsible to inform the public of the date and time of the road closure. The NCC representative must be contacted at least 48 hours before scheduled work that requires road closure. Emergency road closures resulting from planned work must be reported immediately to NCC.

.2 For traffic closing due to preventive and or predictive maintenance the contractor will be responsible to supply all signage, barricades and labour to implement the traffic closing.

.3 Contractor is responsible to obtain road closing permit from the city of Ottawa.

.4 Road closure must be restricted to, between 9 am to 3 pm.

4.7.1.3 REACTIVE MAINTENANCE

The Contractor will provide a 24/7 service for Reactive Maintenance. The said service shall include a dedicated telephone line to respond to any and all emergency situations that relate to the Subject Matter of the Contract. The Contractor must return all calls received within 30 minutes. The telephone number for the Reactive Maintenance service shall remain

the same for the duration of the Term of this Contract and shall be given to the NCC Call Centre and to the NCC 24-hour emergency service centre.

The Contractor will respond to requests for Reactive Maintenance services within the following time requirements:

i. Return all calls received within 30 minutes.
ii. 60 minutes on-site response time[1] between 5:00 a.m. and 8:00 p.m.
iii. 90 minutes on-site response time between 8:00 p.m. and 5:00 a.m.

[1] Response time as set out in 4.7.1.3 ii & iii are calculated from the time the Contractor returns the call to the appropriate NCC representative.

SECTION 5

Section 5 does not apply to this Contract.

SECTION 6 – REPORTING

6.0 REPORTING

The following section describes all administrative, financial and operational reporting requirements of this Contract. The Contractor must prepare and deliver the reports indicated below (at the times specified) and others that the NCC may consider to be required. The NCC shall provide the template for some, but not all of the reports. All reports shall be electronically mailed to the NCC on or before their respective deadline. The Contractor shall be required to make corrections or prepare a new report in cases where the initial report does not meet NCC requirements. The Contractor shall have an extension of 10 Business Days after the deadline to provide a revised or new report satisfactory to the NCC. Without restricting the generality of the foregoing, the Contractor shall deliver reports containing information sufficient to enable the NCC to make informed decisions on the management of its assets.

6.1 ADMINISTRATIVE, FINANCIAL AND OPERATIONAL REPORTS

6.1.3 INSURANCE CERTIFICATE

Proof of insurance must be provided each March 15th during the Term of the Contract (see 2.10.7). At the same time, the Contractor shall submit proof of liability insurance.

6.1.4 WSIB CERTIFICATE

WSIB certificate is a document confirming that the Contractor is registered and that his/her file is in order. Such certificates shall be delivered to the NCC every sixty (60) days in the case of Ontario (April 1st, June 1st, August 1st, October 1st, December 1st and February 1st of each Contract Year) (see 2.15.24).

6.1.5 HEALTH AND SAFETY PLAN

After being informed that his/her tender has been retained and prior to and as a condition of Contract award, the Contractor shall, at his/her own expense, submit to the NCC his/her health and safety plan. See 2.15.24.

6.1.6 ASSET CONDITION REPORT

Within the first ninety days of the Contract the Contractor will, jointly with the CMO, complete an inspection of the assets in order to determine the existing condition of NCC assets. The Contractor must prepare and submit a report following the inspection. The report must contain information that allows the NCC to make timely decisions about the decommissioning of assets and/or their lifecycle replacement and/or Maintenance. The Contractor will propose the content and format of this report. The NCC reserves the right to request additions or modifications to the proposed content and format, following discussions with the Contractor.

SECTION 6 – REPORTING

No longer than ninety days before the end of the Contract Term, the Contractor must complete and submit a second Asset Condition Report, similar in scope to the report described above. This report will be co-signed by the Contractor and the NCC. The fieldwork for this report may be undertaken jointly, at the sole discretion of the NCC.

The end of Contract report must be formatted in the following way:

- It must be in its own vinyl hard cover 3 ring loose-leaf binder (219mmx279mm);
- It must include one electronic copy on CD, in Adobe Acrobat (pdf) format. The CD must be clearly labelled.
- The report must be neatly printed and logically arranged, each site having its own clearly labelled section.

The report must contain the following information for each site:

- A summary.
- The results of any CBM, measurements, tests, observations or other forms of data collection.
- A list of the Preventive Maintenance measures implemented.
- A detailed deficiency list, with recommendations and suggested corrective measures.
- Photographs to help support and illustrate (where useful or necessary) the observations or recommendations.

6.1.7 PREVENTIVE MAINTENANCE REPORT

The Preventive Maintenance report must be completed and submitted to the NCC once yearly. The report is the result of the CBM conducted during the procedure of the same name described in section 4.7. This is also sometimes referred to as the spring start-up. The Contractor will propose the content and format of this report. The NCC reserves the right to request additions or modifications to the proposed content and format, following discussions with the Contractor.

6.1.8 RESPONSE PLAN FOR TOXIC SPILLS

The Contractor will establish a response plan for toxic spills. This plan will be submitted to the NCC for approval within thirty days of Contract commencement. Any modifications to this plan must be presented to the NCC. A report for each toxic spill must be forwarded to the NCC as soon as possible.

6.1.9 PREDICTIVE MAINTENANCE REPORTS

The Predictive Maintenance reports must be completed and submitted to the NCC on a weekly basis. The report is the result of tasks and CBM conducted during the procedure of the same name described in section 4.7. The Contractor will propose the content and format of this report. The NCC reserves the right to request additions or modifications to the proposed content and format, following discussions with the Contractor.

SECTION 6 – REPORTING

6.1.10 OCCURRENCE REPORT (SEE APPENDIX 6-F)

The occurrence report is to be submitted by the Contractor for any issues, emergency situations, observations, public complaints, etc. concerning any of the NCC assets contained in this Contract. Occurrence reports must be forwarded preferably by electronic mail (e-mail) to the NCC within 24 hours of the observation of an incident. Security related occurrences shall be reported as per 2.15.15.

6.1.11 UNSATISFACTORY PERFORMANCE REPORT (SEE APPENDIX 6-G)

The unsatisfactory performance report is to be commented on by the Contractor each time the NCC completes one for any work included in the Contract that has not been provided or has been provided in an unsatisfactory manner.

6.1.15 SECURITY CLEARANCE

Provide all information required to obtain the appropriate security clearance for all Contractor's employees at the beginning of the Contract and when new employees are hired. See 2.15.15.

SECTION 7 – GENERAL INSTRUCTIONS TO PROPONENT

7.0 GENERAL INSTRUCTIONS TO PROPONENT

This section of the TOR provides information about documents which must be submitted with the Tender in response to this tender.

7.2 IDENTIFICATION AND DELIVERY OF TENDERS

Each Tender shall consist of the following:

Mandatory requirements

a. The bid security (see 7.7);

b. Financial tender.

To be submitted in **a separate sealed envelope**. It must include:

One (1) original of the **signed** Fee tender (Appendix 7-A (1) and (2);

The Financial Tender must be submitted in **a separately sealed and clearly marked envelope**. The Fee and cost breakdowns and any other financial information identified in the said Financial Tender must ***not*** appear anywhere else in the documents submitted by the Contractor.

All components of the Tender package, including the separately sealed financial tender envelope, shall be submitted together in a large envelope. The Tender envelope shall be properly identified and delivered, without exception, prior to the closing date and time for submission of tenders.

All Tender envelopes received on time will be kept in a secure place from the time of receipt to the time of opening.

It is the Proponents responsibility to ensure Tenders and all related documents are received at the specified address prior to the closing date and time. Proponents may request a receipt upon delivery.

Facsimile or electronically transmitted Tenders will be treated as non-responsive and will receive no further consideration. However, where a formal Tender has been received on time at the specified address, amendments thereto by facsimile are acceptable provided that such amendments be also received prior to the closing date and time and only at the facsimile number 613-239-5012, be on company letterhead and be signed and dated. All such amendments shall be addressed to the Contracting Authority and shall set forth complete details of all changes in order to be considered as an integral part of the Tender.

SECTION 7 – GENERAL INSTRUCTIONS TO PROPONENT

7.4 LANGUAGE OF THE TENDER AND SUPPORTING DOCUMENTATION

The Tender and any supporting documents may be submitted in either English or French.

7.5 CURRENCY

It is mandatory that all fees, hourly rates/unit prices and taxes submitted in this Financial Tender be in Canadian Dollars in order to be considered compliant and responsive to the RFP.

7.6 SIGNING PROCEDURES FOR THE TENDER

The form identified as Invitation to Tender (NR60) page 3 of 6 and Appendix 7-A-2 shall be properly completed and signed, where signatures are indicated and necessary, in full compliance with the requirements indicated herein:

7.6.1 The signature of person(s) submitting a Tender shall be in their respective handwriting.

7.6.2 Corporation: If this Tender is made by a corporation, the full name of the company shall be accurately PRINTED in the space provided for that purpose (name of Proponent), the form shall be signed by the duly authorized representatives of the company.

7.6.3 Partnership: If this Tender is made by a Partnership, the firm name or the business name shall be accurately PRINTED in the space provided for that purpose (Name of Proponent) and the names of all partners shall be PRINTED immediately under their respective signatures.

7.6.4 Sole Proprietorship: If this Tender is made by an individual carrying on business under a name other than his/her own, his/her business name together with the name of the sole proprietor shall be accurately PRINTED in the space provided for that purpose (Name of Proponent). In the event that the sole proprietor carries on business in his/her own name, he/she shall merely PRINT his/her name where indicated.

7.6.5 Joint Venture: If this Tender is made by a **joint venture corporation** (i.e. an incorporated body), the full name of the company shall be accurately PRINTED in the space provided for that purpose (Name of Proponent) and the form shall be signed by the duly authorized representatives of the joint venture corporation. If this Tender is made by a **joint venture partnership** (i.e. where there is an intention to create a partnership), the firm name or business name shall be accurately PRINTED in the space provided for that purpose (Name of Proponent) and the names of all partners shall be PRINTED immediately

SECTION 7 – GENERAL INSTRUCTIONS TO PROPONENT

under their respective signatures. If this Tender is made by a **Contractual joint venture** (i.e. no separate entity, but simply a Contractual arrangement between two parties), the requirements set out above for corporations, partnerships or sole proprietorships must be followed as applicable for each of the parties to the joint venture arrangement.

7.6.6 Tenders received without signed forms, where signatures are indicated and necessary, shall render the Tender non-responsive and it shall receive no further consideration.

7.7 MANDATORY BID SECURITY REQUIREMENTS

7.7.1 Proponents must submit, with the Tender, the following mandatory bid security as an integral part of any Tender submission. Failure to submit bid security shall render the Tender as non-responsive and it shall receive no further consideration.

7.7.2 ACCEPTABLE FORMS OF BID SECURITY

The following link to Treasury Board's website provides a list of insurance companies whose bonds may be accepted as security by the government.

http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=12027&section=text#L

Please use form inserted in Appendix 7-B.

7.7.2.1 An unconditional irrevocable letter of credit or a letter of guarantee issued by one of the five largest Canadian chartered banks in a form acceptable to the NCC for the sum of N/A or;

7.7.2.2 A certified cheque drawn on a bank to which the Bank Act or in Québec the Credit Union Act applies, and made payable to the order of the National Capital Commission for the sum of N/A or;

7.7.2.3 A bid bond from a company acceptable to the NCC (see 7.7.2 and Appendix 7-B) and in terms satisfactory to the NCC for the sum of N/A or;

7.7.2.4 Bonds of the Government of Canada unconditionally guaranteed as to principal and interest by the Government of Canada and having a par value of N/A if such bonds are:

Payable to the bearer; and

Accompanied by a written instrument of transfer, duly executed by the registered owner, whose signature shall be guaranteed by a chartered bank or financial institution satisfactory

to the NCC. Coupon bonds shall have attached thereto all coupons unmatured at the time the bonds are delivered to the NCC. Coupons maturing during the retention of the security by the NCC shall be returned to the Proponent upon request. Coupons which matured prior to submitting a Tender are to be detached by the Proponent.

7.7.3 The bid security shall remain in place for 90 working days after the closing date and time of the RFP, until Contract award or until notification by the NCC that a Proponent is unsuccessful, whichever date is later. The NCC reserves the right to request extensions for additional 60 day periods as required.

7.7.4 The bid security shall be forfeited if the Proponent withdraws or amends all or any part or parts of its Tender at any time after the specified RFP closing date and time and prior to the award of a Contract or refuses to enter into a Contract when called upon to do so. The NCC may, if, in its discretion, it is in the public interest to do so, waive this right.

7.7.5 Bid security in the form of, letters of credit, certified cheques or Bonds of the Government of Canada, of the unsuccessful Proponents or, if no Tenders are accepted, of all Proponents, will be returned.

7.7.6 The bid security of the Successful Proponent will be returned once the Successful Proponent has entered into a Contract with the NCC and provided the requested performance security.

7.9 EVALUATION PROCESS

N/A

SECTION 7 – GENERAL INSTRUCTIONS TO PROPONENT

7.10 BASIS OF AWARD

See Invitation to tender document (NR60) page 3 of 6 section 4.2.

7.11 ACCEPTANCE OF TENDER

7.11.1 The NCC reserves the right to not accept any of the tenders submitted, to cancel the Request for Tender and/or to reissue the Request for Tender in its original or revised form. The NCC also reserves the right to negotiate with the Successful Proponent and/or any/all Proponents.

7.11.2 Without limiting the generality of 7.11.1, the NCC may reject any tender, based on an unfavourable assessment as to:

7.11.2.1 The adequacy of the proposed price to carry out the work;

7.11.2.2 The Proponent's performance on other Contracts, including but not limited to, the Contracts the Proponent may have had or may still have with the NCC.

7.11.3 In assessing the Proponent's performance on other Contracts pursuant to 7.11.2.2, the NCC may consider, but shall not be limited to, such matters as:

7.11.3.1 The efficiency and workmanship of the Proponent in performing the work; and

7.11.3.2 The extent to which the Proponent executed the work in accordance with the Terms and Conditions of the Contract.

7.11.3.3 Vendor Performance Background:

The NCC may reject a bid where any of the following circumstances are present:

- The Proponent or any employee or subContractor included as part of the tender, has been convicted under section 121 ("Frauds on the government" & "Contractor subscribing to election fund"), 418 ("Selling defective stores to Her Majesty") of the Criminal Code; or

With respect to current or prior Contracts with the NCC or the Government of Canada

- The Proponent is bankrupt or where, for whatever reason, its activities are rendered inoperable for an extended period;
- The NCC has evidence, satisfactory to the NCC, of fraud, bribery, fraudulent misrepresentation or failure to comply with any law protecting individuals against

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any matter of discrimination, on the part of the Proponent, any of its employees or any subContractor included as part of its tender;

- The NCC has exercised its Contractual remedies of suspension, setting off or termination for default with respect to a Contract with the Proponent, any of its employees or any subContractor included as part of its bid; or
- The Proponent's performance on current or prior Contracts, including the efficiency and workmanship as well as the level of compliance with Contractual Terms and Conditions is, unsatisfactory to the NCC and has been documented as such.
- Where the NCC intends to reject a tender pursuant to a provision to paragraph 1, the Contracting Authority shall so inform the Proponent and provide the Proponent ten (10) days within which to make representations, prior to making a final decision on the rejection of the tender.

7.12 CONDITIONS OF CONTRACT AWARD

Prior to Contract award, the successful Proponent shall provide the following:

7.12.1 JOINT VENTURE AGREEMENT

If the successful Proponent is a joint venture, the signed joint venture agreement must be presented (see 7.3 of this RFP).

7.12.4 PROOF OF INSURANCE

The Successful Proponent shall provide proof of insurance in accordance with the requirements specified in 2.10.7 of this RFP.

7.12.5 SUPPLIER – DIRECT PAYMENT AND TAX INFORMATION FORM

The Proponent shall complete and submit to the NCC the Direct Payment and Tax Information Form prior to Contract award. The direct payment service will facilitate the transfer of amounts payable by the NCC to suppliers. The tax information section of the form is a requirement of the *Income Tax Act*.

7.12.6 CSST OR WSIB CERTIFICATE

The Successful Proponent shall provide a CSST or WSIB certificate as applicable. This is a document confirming that the Contractor is registered and that his/her file is in good standing order (see 2.15.24.1.7).

7.12.7 SECURITY REPRESENTATIVE

SECTION 7 – GENERAL INSTRUCTIONS TO PROPONENT

The Successful Proponent shall provide the name of his/her security representative (see 2.15.15).

7.12.8 HEALTH AND SAFETY PLAN

The Successful Proponent shall provide his/her health and safety plan (see 2.15.24.1.5).

7.13 ADDITIONAL TERMS AND CONDITIONS

7.13.1 OWNERSHIP OF DOCUMENTS

7.13.1.1 All documents submitted or prepared by the Contractor under the terms of the Contract shall become the property of the NCC, which shall become the owner of the copyright.

7.13.1.2 All documents and records, and the information contained therein, provided to the Contractor related to or for the purposes of this Contract shall be treated as confidential. The Contractor shall take all necessary steps to ensure that the documents and records, or any information contained therein, are not copied, provided to, discussed or disclosed in any manner whatsoever, to any person or entity, other than NCC personnel, unless expressly authorized by the NCC. The Contractor shall ensure that only its authorized employees are given access to the said documents or records and that these employees treat these documents and records, and the information contained therein, as confidential.

7.13.1.3 As may be directed in writing by the NCC upon the expiry, termination or completion of the Contract, the Contractor shall either return to the NCC forthwith all documents or records provided to it by the NCC or destroy all documents and records, together with satisfactory proof of such destruction.

7.13.1.4 The NCC shall have unrestricted access to all documents and records provided to the Contractor during the Term of the Contract.

7.13.2 ACCESS TO INFORMATION

Tenders shall be held in strict confidence. However, Proponents are reminded that the NCC, as a Crown corporation, is subject to the provisions of the *Access to Information Act*. Information submitted may be eligible for disclosure in accordance with the requirements of the *Access to Information Act*. In such circumstances, the NCC shall be relieved of its obligation thereunder to keep such information confidential. Such information is usually not released without consent of the pertinent Proponent, unless there is an order made pursuant to the *Act*. However, the Proponent consents to the public disclosure of its Grand

SECTION 7 – GENERAL INSTRUCTIONS TO PROPONENT

Total by the NCC, and further agrees that it will have no right to claim against the NCC, its employees, agents or servants, or any of them, in relation to such public disclosure.

7.13.3 LIMITATIONS & CAUTIONS

7.13.3.1 Tenders shall be irrevocable and remain unchanged in all aspects, including price, during the period of time between the closing date of this RFP and the identification of the Successful Proponent unless expressly agreed to by both the NCC and the Proponent.

7.13.3.2 The NCC reserves the right to request clarification from the Proponent for a mandatory requirement submitted in response to the RFP that in the sole opinion of the NCC, is marginally responsive or vague. Any information previously submitted to the NCC may not be incorporated in this RFP by reference but shall be resubmitted with the Tender nor shall the NCC accept additional information after the closing date of the RFP.

7.13.3.3 Nothing, including but not limited to, this RFP or the Proponent's response hereto, shall in any way impose a legal obligation on the NCC to purchase or otherwise acquire any product or service from any of the Successful Proponents, unless and until the RFP has received all requisite external approvals and has been executed by the NCC and the Proponent.

7.13.3.4 The NCC shall not be obligated to reimburse or compensate any Proponent, its subContractors or manufacturers for any costs incurred in connection with the preparation of a response to this Request for Tender. All copies of tenders submitted in response to this Request for Tender shall become the property of the NCC and shall not be returned.

7.13.3.5 The successful Contractor shall indemnify and save harmless the NCC from and against all claims, damages, costs and expenses sustained or incurred by the NCC resulting from any action or legal proceeding on infringement, made, sustained, brought, prosecuted, threatened to or prosecuted, by any Person that was under the direction and control of the Contractor during the Term of the resulting Contract and which Person is claiming or claims a moral right, as set out under the *Copyright Act*. The obligation to indemnify under this clause survives termination of the resulting Contract and shall remain in force for the duration of the copyright in the work created under the resulting Contract. This obligation to indemnify relative to alleged moral rights infringement(s) is in addition to the Contractor's other obligations to indemnify and save harmless which are set out in the Contract

Appendix 2-D – NCC Environmental Guidelines

Revised by the National Capital Commission, March 2012

INTRODUCTION

The National Capital Commission is dedicated to protecting the natural environment in the National Capital Region as well as the health and safety of residents and visitors to the region.

The NCC's Environmental Strategy provides a focused agenda for environmental leadership in Canada's Capital Region. The strategy builds on the corporation's strong tradition of environmental stewardship and reflects its core mission to build a great capital and create national pride and unity among all Canadians. Its goals center around five key areas for action, all of which will be reflected in the following guidelines. These areas for action are reducing waste, enhancing biodiversity, preventing pollution, leading in environmental practices and combating climate change.

One specific objective of the strategy is to ensure that environmentally sensitive practices are integrated into all maintenance contracts. This Guideline document was prepared to provide NCC's contractors and sub-contractors, land access permit holders and agreement partners with a guide to activities and practices which are appropriate in meeting the NCC's environmental commitments. It is a tool for the planning and implementation of activities on NCC property, designed to assist in developing a better understanding and awareness of the potential environmental effects which arise from normal business activities. Implementation of the practices identified in this Guideline will help to minimize those potential effects and assist in ensuring compliance with applicable environmental regulations.

REGULATORY OVERVIEW

The NCC is committed to carrying out all of its activities in compliance with all applicable federal, provincial, and municipal acts, regulations, policies, codes of practice and bylaws. Legislative and regulatory tracking is required on a continuous basis to ensure that all activities are performed in accordance with these requirements.

It is the responsibility of all NCC's contractors and sub-contractors, land access permit holders and agreement partners to ensure that they comply with all legislation and regulatory requirements in effect while performing any work or service on NCC land. A list of the acts, and their general provisions, which have been identified as having applicability to the NCC and, by extension, to its tenants, employees and contractors, can be found in Appendix I "**Regulatory Overview**" (*found at the end of this appendix*). **This list should not be taken as exhaustive** and legal advice should be obtained in any situation where questions arise related to compliance with legislation or regulatory requirements.

ENVIRONMENTAL PRACTICES

The environmental practices outlined in this section provide specific guidance that must be followed by all individuals or contractors performing activities and daily maintenance on NCC properties. These practices are designed to minimize potential impacts on the environment and meet the NCC's environmental commitments. In most cases, a project will entail a number of

different practices; therefore, all guidelines should be reviewed before operations begin and precautions should be made where applicable.

In accordance with the NCC's Environmental Strategy, the practices have been divided into five areas for actions.

1.0 REDUCING WASTE

1.1 Solid Waste Management

All contractors and tenants are responsible for collecting, removing, and disposing of the solid waste that they generate and the waste generated on properties for which they are responsible. The NCC is committed to responsible waste management practices, and the reduction, reuse, and recycling of materials. The following requirements must be met in handling and disposing of solid waste.

- All properties must be kept clean and clear of waste. Waste and litter must be collected on a regular basis. All waste must be stored in a covered receptacle prior to disposal.
- All solid waste must be disposed of in accordance with all applicable environmental laws. The contractor must be aware of any restrictions or prohibitions in force at the disposal site. Where in effect, all municipal recycling and composting procedures shall be respected.
- In general, burning of waste is prohibited on NCC property. Branches and cuttings may only be burned on NCC property with prior NCC authorization and with appropriate municipal permits for burning.
- Contractors that provide services to the NCC for recycling disposal must report the total weight diverted from landfills.
- Tenants and contractors shall, to the extent practicable follow green demolition and recycling practices.

1.2 Septic Waste Management

- Septic wastes must be disposed of in municipally approved or licensed facilities.

2.0 ENHANCING BIODIVERSITY

2.1 Species at Risk and Protected Habitats

The NCC has identified 28 valued ecosystems and habitat areas within the National Capital Region that have natural environmental features which, for various reasons, are considered important and/or sensitive to disturbance. These areas have been mapped for the purpose of protecting these valuable resources from impacts caused by development proposals or incompatible activities or land uses. In addition, numerous federally and provincially protected species/habitat areas are dispersed throughout NCC lands (Greenbelt, Gatineau Park and Urban Lands). The following requirements must be met to prevent adverse impacts on these areas and features.

- All activities on NCC lands must have prior approval from the NCC, and contact must be made with the NCC to confirm the presence of species at risk and protected habitats within the vicinity in which work will be undertaken. Any work restrictions or practices which must be taken on the

site will be determined jointly with the contractor/tenant and the NCC.

- Consult with NCC staff prior to working within Gatineau Park or the Greenbelt to identify those areas where particular attention is required due to the presence of rare or endangered species or their habitats.
- No work will be permitted in wetlands without prior approval of the NCC following consultation with, and authorization from relevant federal and provincial authorities.

2.2 Wildlife Management

Wildlife management refers to all activities which have the potential to impact wildlife (birds, fish, mammals) or change their natural habitat. Many animals live within NCC property and have specific habitat requirements. Sudden changes, such as drainage of wetlands, cutting of trees or increases of sediment in a stream, or specific impacts, such as loud noise associated with construction projects or maintenance activities, can have significant impacts on local wildlife. The following guidelines must be respected when working on NCC property.

- Wildlife on NCC property must not be chased, harassed or hunted.
- All waste and litter must be collected and removed on a daily basis, or stored in secure containers to prevent scavenging by wildlife.
- Trees or vegetation areas with nests or evidence of wildlife use must not be disturbed without the prior approval of NCC staff.
- All motorized vehicles must stay within designated rights-of-way and established trails to avoid disturbance to wildlife habitat.
- Beaver and any other nuisance wildlife can only be removed.

2.3 Vegetation

Special attention needs to be given to activities that can potentially change or impact natural vegetation. Operations involving vehicles and/or heavy machinery pose particular risks. The following guidelines must be respected when working on NCC property.

- Any activity requiring the removal of vegetation must have the prior approval of the NCC.
- As a general rule, a minimum 30-metre vegetation buffer should be left intact adjacent to any watercourse or water body. Buffers must meet or exceed applicable best management practices.
- Consult with NCC staff prior to working on NCC lands to identify areas where particular attention is required due to the presence of rare or endangered plant species.
- Construction equipment should be cleaned before it comes on to NCC property, and before moving it from one area to another to prevent the spread of undesirable plant species, noxious weeds and soil pests.
- Following construction or other disturbance of land cover, seeding and fertilizing with appropriate mixtures must occur as soon as possible to help prevent erosion.
- No fertilizer is to be applied within 3 m of a watercourse or water body; no product containing Phosphorus or Nitrogen is to be applied within 13 m of a watercourse or water body.

- Landscaping must be completed in accordance with NCC landscaping plans and designs.
- Re-vegetation will be with selected native species and in accordance with re-vegetation plans approved by the NCC.
- *See Section 3.8 for pesticide, herbicide, insecticide, and fungicide practices.*

3.0 PREVENTING POLLUTION

3.1 Water Quality

Many activities have the potential to impact on water quality. Impacts may include the deposit of sediment, release of nutrients from fertilizers, or the release of toxic substances from commercial or industrial processes. Measures need to be taken to ensure that such impacts are prevented and that regulations in this area are met.

- Runoff from agricultural fields should be monitored to ensure that excessive nutrients or pesticides are not released to surface waters.
- Discharges to sanitary and storm sewers must be in compliance with all local requirements.
- Shores and floodplains should be protected by maintaining vegetation cover to prevent degradation and erosion.

3.1.1 Snow Disposal

- Snow that is removed and transported for disposal must be disposed of at an authorized snow dumping facility.
- No snow dumping is permitted on NCC property.
- No snow may be piled within 10 m of a water body or water course.

3.2 Waste Water Discharge

When water leaves a site, it is either discharged to the sanitary sewer, the storm sewer, a natural water body, or the ground, where it can enter groundwater. The quality of water discharged can negatively impact the quality of the receiving waters and the health of humans, animals, and plants which use this water. Federal, provincial, and municipal laws and regulations prohibit water pollution and establish requirements for the quality of waste water. To reduce water pollution, all activities which produce and discharge waste water must adhere to the following requirements.

- All sources of waste water from a project must be identified and the quality of the water identified (e.g. does it contain suspended solids? Oil and grease? Is it acidic?).
- No waste water will be deposited into a natural water body without pre-authorization from the NCC in consultation with appropriate regulatory authorities.
- Do not dilute waste water in order to meet regulatory requirements.

3.3 Stormwater and Surface Water Policy

- Do not discharge any storm water or surface runoff into a sanitary sewer. Only water used for domestic purposes can be released into the sanitary sewer system unless the waste water meets all water quality requirements.
- Stormwater should be managed in accordance with the NCC Stormwater Policy.
- Yards and sites shall be graded to prevent excessive or recurrent ponding of stormwater.

3.4 Fuel Storage Tank Management

Fuel storage tanks include aboveground and underground storage tanks used to store products such as gasoline, diesel, motor oil, and heating oil. No fuel storage tanks may be installed on NCC property without the prior written approval of the NCC. The NCC reserves the right to immediately remove or request immediate removal by the contractor of any fuel storage tanks that have been installed or are being used by the contractor without prior written approval from the NCC. The following guidelines must be followed when installing, constructing and/or using fuel storage tanks.

- No new underground storage tanks are to be installed on NCC property.
- All above grade bulk fuel storage tanks must be adequately bermed and/or have double walled tanks, and be lined with an impermeable liner to contain spillage. The containment berm must be capable of holding a minimum of 110% of the largest storage tank.
- Refueling of non-permanent fuel storage tanks must not be performed within 100 metres of any water body.
- All spills MUST be reported to the NCC Environmental Services division immediately. All spills must also be reported to the appropriate provincial authority where a spill:
- These spills must be contained and cleaned up in accordance with all federal, provincial, and local regulatory requirements.
- A spill report form has been prepared by the NCC and must be completed and sent to Environmental Services within 24 hours of the spill. The spill form in included in the reporting section of this contract.

3.5 Hazardous Materials Management

Hazardous materials management is a broad term encompassing the storage, use, handling, transportation, and disposal of materials which can pose a hazard to human health, animal health, or the natural environment. This category includes all chemicals which may be used on NCC property, including materials such as fuels, oils and lubricants, paints, thinners, pesticides, herbicides, insecticides, fungicides, fertilizers, and dust suppressants. The following guidelines must be followed when storing, handling, or disposing of these materials.

- All hazardous materials on NCC property must be stored in accordance with applicable regulations, standards and guidelines. Flammable materials must be stored in accordance with the National Fire Code of Canada.
- Material Safety Data Sheets (MSDS) must be readily available for all hazardous materials brought on to NCC property. All employees handling

these materials must have received training on the Workplace Hazardous Materials Information System (WHMIS) and on proper handling, storage and disposal of these materials.

- All hazardous materials must be labelled in accordance with WHMIS requirements.
- Absorbent material must be available whenever liquid hazardous materials are being used on NCC property. Staff must be trained on how to use and dispose of this material in the event of a spill (*see Section 3.7 on Spills*).
- When transporting hazardous materials, these materials must be labelled and transported in accordance with provincial and federal regulations regarding the transportation of dangerous goods.
- Hazardous wastes, and containers which previously contained hazardous materials, must be disposed of in accordance with provincial and federal regulations.

3.6 Contaminated Sites Management

The NCC is committed to preventing the contamination of its properties. Any activity or incident which has the potential to result in contamination needs to be dealt with as quickly as possible to ensure that the further release of contaminants is minimized.

- Before digging or manipulating a site, the NCC must be consulted to ensure that the site is not contaminated.
- If any suspected contamination is discovered, the NCC must be notified immediately.

3.7 Spills / Emergency Response

All emergency situations MUST be reported immediately to 911 and then to the NCC 24 Hour Emergency Communications Service at 613 239-5353.

The NCC has developed a Spills Procedure to ensure that an appropriate and consistent responses are implemented to deal with emergencies or accidents. All individuals performing work on NCC property are expected to be familiar with the general requirements for reporting and responding to environmental emergencies on NCC property. In addition, the following requirements must be met.

- Spill response materials should be available wherever hazardous materials are used or stored. These spill response materials should be suitable in type and quantity to the type and quantity of hazardous materials being used at that location.
- Employees must be trained on how to use the spill material and equipment.
- All used absorbent material must be disposed of in accordance with applicable regulatory requirements.
- In the event of an emergency, follow the procedures outlined in the NCC Spills Procedure.
- Any release of potential contaminants, such as fuel, chemicals, or other hazardous materials, must be reported to the NCC Environmental Services

division immediately.

- All spills must also be reported to the appropriate provincial authority where a spill:
  - discharges to air, land or water;
  - is in excess of normal usage, has escaped its means of containment, or has been combined with other products affecting its chemical stability which could cause an adverse effect (i.e. negative impact on health, environment or property).
- Spills must be contained and cleaned up in accordance with all federal, provincial, and local regulatory requirements.
- A spill report form has been prepared by the NCC and must be completed and sent to Environmental Services within 24 hours of the spill. The spill form is included in the reporting section of this contract.
- Any release of potential contaminants, such as fuel, chemicals, or other hazardous materials, must be reported to the NCC immediately, and a Spill Report, Response and Review Log must be completed by following the Spill Procedure in place. The Spill Report, Response and Review Log should be submitted to the NCC Contract Manager and it should provide details on the spill.

3.8 Pesticides, Herbicides, Insecticides, and Fungicides

On April 22, 2009, Ontario amended its pesticide legislation to ban the cosmetic use of pesticides. This complements legislation established in Quebec in 2003. In addition, the NCC is committed to develop a policy by 2012 to eliminate the cosmetic use of pesticides on its lands All activities that take place on NCC lands must be in full compliance with all federal pesticides legislation and regulations as well as be in full compliance with the requirements under the Ontario Pesticide Act and the Quebec Pesticide Act, depending on the province where the activity is taking place.

- The contractor must receive authorization in writing by the NCC for any exceptional circumstances requiring application of pesticides, herbicides, insecticides or fungicides.

3.9 Designated Substances

Many facilities contain materials which present potential risks to human health and the environment. These can include Acrylonitrite, Arsenic, Asbestos (may be present in insulation, caulking, vinyl floor tiles, drywall, roofing materials, etc.), Benzene, Coke oven Emissions, Ethylene Oxide, Isocyanates, Lead (may be present in paint, fixtures, solder material, etc.), Mercury (present in vapour form in fluorescent light tubes; may be present in thermometers, gauges, thermostats, etc.), Polychlorinated biphenyls (PCBs), Silica (present in concrete structures), Vinyl Chloride. These substances must be carefully managed throughout the life of the facility to reduce the potential for negative health impacts. The following requirements must be met for buildings and facilities on NCC property.

- Prior to entering a site, contact the NCC to determine if any designated substances are present.
- Determine if a Designated Substance Survey has been completed prior to initiating a renovation or demolition activity. If no survey has been completed, ensure that one is performed prior to beginning work.
- Handle and dispose of all designated substances in accordance with all federal, provincial, and municipal requirements.
- Ensure employees are trained on the identification and handling of designated substances.

4.0 LEADING IN ENVIRONMENTAL PRACTICES

4.1 Sedimentation

When working in the area of surface water bodies, there is a need to prevent the deposit sediments into the water. Sediment can have a significant impact on fish and fish habitat. This issue is of particular concern during maintenance activities or where agricultural practices leave the soil surface exposed. The following general practices to reduce sedimentation and erosion must be followed on NCC property.

- Confirm with the NCC's Portfolio Manager the regulatory approvals that may be required prior to working in or near a water body.
- Minimize the extent and duration of disturbance to slopes and shorelines.
- No in-stream work is allowed without NCC's approval.

4.1.1 Maintenance activities

- Temporary erosion control structures are required on all maintenance sites immediately after vegetation clearing is required or temporary storage of stonedust, sand, topsoil, etc.
- Do not stockpile or deposit cleared organic materials within 30 m of a watercourse or drainage ditch.
- When the topsoil and/or soil are to remain stockpiled for an extended period of time, ensure piles are covered to prevent soil loss and dust problems.
- Silt fences and/or straw bales should be considered to prevent siltation down slope from the maintenance area where a water body may be affected.
- Minimize clearing of extra work spaces: if you don't need it, don't clear it.

4.1.2 Agricultural practices

- Maintain a buffer of undisturbed vegetation along stream banks and adjacent to water bodies that meets or exceeds the provincial requirements of 3 metres.

4.2 Environmental Assessment

Environmental Assessments (EAs) are conducted on plans, projects, and activities to ensure that potential environmental impacts are identified and appropriate mitigation measures are implemented to avoid, minimize or mitigate potential adverse environmental effects from proposed developments and certain activities. The federal Canadian Environmental Assessment Act (CEAA) requires that the NCC ensure that EAs for coducted and approved for those projects and activities. It is the responsibility of tenants and contractors to ensure that Portfolio Managers are consulted before constructing or performing work that may require an EA and to respect the mitigation measures identified in any EAs that have been conducted for works and activities on NCC land.

- Where maintenance activities will occur in proximity to a watercourse (including drainage ditches), lakes, or wetlands, the Portfolio Manager must be contacted to determine:
  a) if the project or activity has been previously assessed and to obtain the environmental protection (mitigation) measures that must be applied;
  b) if the project or activity should be the subject of an environmental assessment to establish the required environmental protection (mitigation) measures and other authorizations (federal, provincial or municipal) that may be required; or
  c) if the maintenance activity should be conducted during the period proposed, or deferred to a later period because of environmental considerations in the area of the proposed activity.
- Where an EA is required, the project proponent will be required to complete an environmental assessment in accordance with the NCC Administrative Policy on EA.

5.0 COMBATTING CLIMATE CHANGE

5.1 Air Emissions

Many activities contribute to air pollution, including vehicle exhaust, smoke and particles emitted from fuel burning equipment, solvent vapours from activities such as painting and degreasing, and dust and other solid particles from construction and demolition. Efforts should be made to minimize air emissions from these activities. The following practices will help to reduce these emissions.

- To the extent possible the Contractor will minimize unnecessary idling of vehicles which can result in the wastage of fuel and creation of greenhouse gases (refer to municipal by-laws).
- All air emissions must meet regulatory requirements. Where required, a certificate of approval must be obtained from provincial authorities for stationary sources of air pollution (e.g. stacks, boilers, fume hoods).
- Use low-sulphur diesel or ethanol-based fuel wherever possible to reduce vehicle emissions.
- Regularly service vehicles and practice preventive maintenance to reduce vehicle emissions.
- The use of energy efficient vehicles and machinery is encouraged to reduce carbon emissions.

- Whenever possible, it is recommended to use renewable sources of electricity to prevent unnecessary emissions.

6.0 NCC POLICIES FOR REFERENCE

The six following Environmental Policies are available upon request:

- Corporate Environmental Strategy – Building a Greener Capital!
- Corporate Administrative Policy and Procedures – Environmental Assessment
- Stormwater Management Policy
- Contaminated Sites Management Procedures
- Designated Substances Risk Management Procedures
- NCC Spills Procedure

Appendix I – Regulatory Overview

Revised by the National Capital Commission, March 2012

FEDERAL

Canadian Environmental Protection Act
- *Environmental Emergency Regulations*
- *Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations*
- *Federal Halocarbon Regulations, 2003*
- *Gasoline and Gasoline Blend Dispensing Flow Rate Regulations*
- *Gasoline Regulations*
- *Ozone-Depleting Substances Regulations*
- *PCB Regulations*
- *PCB Waste Export Regulations, 1996*
- *Perfluorooctane Sulfonate and its Salts and Certain Other Compounds Regulations*
- *Polybrominated Diphenyl Ethers Regulations*
- *Prohibition of Certain Toxic Substances Regulations, 2005*
- *Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations*
- *Sulphur in Diesel Fuel Regulations* see bove
- *Sulphur in Gasoline Regulations*

Alternative Fuels Act

Migratory Birds Convention Act
- *Migratory Birds Regulations*

Fisheries Act
- *Fish Health Protection Regulations*
- *Fishery (General) Regulations*
- *Marine Mammal Regulations*
- *Ontario Fishery Regulations, 1989*
- *Ontario Fishery Regulations, 2007*
- *Quebec Fishery Regulations, 1990*

Canada Wildlife Act
- *Wildlife Area Regulations*

Canadian Environmental Assessment Act
- *Regulations Respecting the Coordination by Federal Authorities of Environmental Assessment Procedures and Requirements*

Energy Efficiency Act
- *Energy Efficiency Regulations*

Fertilizers Act
- *Fertilizers Regulations*

Forestry Act
- *Timber Regulations, 1993*

Pest Control Products Act
- *List of Pest Control Product Formulants and Contaminants of Health or Environmental Concern*
- *Pest Control Products Incident Reporting Regulations*
- *Pest Control Products Regulations*

Plant Protection Act
- *Plant Protection Regulations*

Species at Risk Act

Canada Labour Code (Part II – Occupational Health and Safety)

Hazardous Products Act
- *Controlled Products Regulations*
- *Any other applicable regulations (dependant on type of work)*

Navigable Waters Protection Act
- *Navigable Waters Works Regulations*

Transportation of Dangerous Goods Act
- *Transportation of Dangerous Goods Regulations*

PROVINCIAL – ONTARIO

Conservation Authority Act
Conservation Land Act
Crown Forest Sustainability Act
Dangerous Goods Transportation Act
Drainage Act
Endangered Species Act
Species at Risk in Ontario List
Energy Conservation Leadership Act
Environmental Assessment Act N/A
Environmental Bill of Rights
Environmental Protection Act
Air Pollution – Local Air Quality Regulations
Airborne Contaminant Discharge Monitoring and Reporting Regulations
Classification and Exemption of Spills and Reporting of Discharges Regulations
Containers Regulations
Designation of Waste Regulations
Environmental Penalties
Ethanol in Gasoline Regulations
Gasoline Volatility Regulations
General – Air Pollution Regulations
General – Waste Management Regulations
Greenhouse Gas Emissions Reporting Regulations
Industrial, Commercial, and Institutional Source Separation Programs
Landfilling Sites Regulations
Motor Vehicles Regulations
Ozone Depleting Substances – General Regulations
Spills Regulations
Sulphur Conent of Fuels Regulations
Waste Management – PCB's Regulations
Fish and Wildlife Conservation Act
Forestry Act
Forest Fires Prevention Act
Green Energy Act
Greenbelt Act
Lakes and Rivers Improvement Act
Construction Regulations
Nutrient Management Act
Ontario Occupational Health and Safety Act
Ontario Water Resources Act
Pesticides Act
Public Lands Act
Technical Standards and Safety Act
Gaseous Fuels Regulations
Liquid Fuels Regulations
Propane Storage and Handling Regulations
Waste Audits and Waste Reduction Work Plans Regulations
Waste Diversion Act
Waste Management Act
Wilderness Areas Act

PROVINCIAL – QUEBEC

Dam Safety Act
Dam Safety Regulation
Environment Quality Act
Regulation respecting wood-burning appliances
Regulation respecting motor vehicle traffic in certain fragile environments
Regulation respecting the declaration of water withdrawals
Regulation respecting solid waste
Regulation respecting mandatory reporting of certain emissions of contaminants into the atmosphere
Regulation respecting greenhouse gas emissions from motor vehicles
Regulation respecting the burial of contaminated soils
Regulation respecting the landfilling and incineration of residual materials
Regulation respecting waterworks and sewer services
Regulation respecting waste water disposal systems for isolated dwellings
Regulation respecting environmental impact assessment and review
Regulation respecting halocarbons
Regulation respecting the recovery and reclamation of used oils, oil or fluid containers and used filters
Regulation respecting snow elimination sites
Regulation respecting hazardous materials
Regulation respecting environmental standards for heavy vehicles
Policy for the protection of lakeshores, riverbanks, littoral zones and floodplains
Regulation respecting the prevention of water pollution in livestock operations
Land Protection and Rehabilitation Regulation
Regulation respecting the quality of the atmosphere
Regulation respecting the recovery and reclamation of discarded paint containers and paints
Regulation respecting contaminated soil storage and contaminated soil transfer stations
Natural Heritage Conservation Act
Rules of procedure governing public consultation on protected areas
Pesticides Act
Pesticides Management Code
Regulation respecting permits and certificates for the sale and use of pesticides
Petroleum Products Act
Sustainable Development Act
Tree Protection Act
Water Resources Preservation Act
Watercourses Act
Regulation respecting the water property in the domain of the State
An Act respecting Occupational Health and Safety
An Act respecting the Société des établissements de plein air du Québec
An Act respecting the Société québécoise de récupération et de recyclage
An Act respecting the conservation and development of wildlife
An Act respecting threatened or vulnerable species
Regulation respecting threatened or vulnerable plant species and their habitats
An Act to affirm the collective nature of water resources and provide for increased water resource protection

Appendix 6-F: Occurrence Report

Occurrence Report (emergency, observation, complaint) #_____ - _____

(attach photo/map whenever possible – use back of form as needed)

Initial report forwarded to:					
Completed report returned to:					
Date:		Time:			
Site:					
Occurrence Type	_____	Region	_____	Atlas Sheet	_____
Category	_____	Sector	_____	Component Id.	_____
Details (description of incident/complaint/observation, estimate):					
Action taken/required (service contacted):					
Reported by:		Phone #:			
Date:		Fax #:			
Follow-up Action required:					
Date completed:					
Comments:					
Signature:		Date:			

Shaded Portion for NCC use only

APPENDIX 6-G

NCC CCN Canada

Supplier no. / N°. de fournisseur

UNSATISFACTORY PERFORMANCE REPORT
RAPPORT DE RENDEMENT INSATISFAISANT

Date of report / Date du rapport :

Project Officer / Agent de projet :	Contract no. / N°. de marché :

Description of work : (building, equipment or type of work being reported on)
Description du travail : (immeuble, matériel ou travaux visés faisant état du rapport)

Contractor / Entrepreneur :	Address / Adresse :
	Postal code / Code postal :

Supporting data : (additional supporting data, including photographs if applicable)
Pièces justificatives : (renseignements supplémentaires incluant les photographies, s'il y a lieu)

Description of unsatisfactory performance : (summary of problem, duration, cause, remedial action attempted)
Description du rendement insatisfaisant : (brève description du problème, durée, cause, mesures envoyées)

Recommendations of Project Officer / Recommandations de l'agent de projet :

Project Officer's signature / Signature de l'agent de projet	Telephone number / Numéro de téléphone	Date

For Procurement Officers use only / À l'usage des agents d'approvisionnement seulement :

Comments :

APPENDIX 7-A-2
STANDING OFFER AGREEMENT RATES
REACTIVE MAINTENANCE

	Item	Description	estimated quantities*	Regular hourly rate	(A) Totals	estimated quantities*	Premium hourly rate	(B) Totals
1	Senior Service Technician with tools and vehicle.	Hourly rate for one senior Service Technician, with tools of the trade and service vehicle.	14 man-hrs	x $_____/man-hr =	$ -	6 man-hrs	x $_____/man-hr =	$ -
2	Service Technician with tools and vehicle.	Hourly rate for one Service Technician, with tools of the trade and service vehicle.	35 man-hrs	x $_____/man-hr =	$ -	15 man-hrs	x $_____/man-hr =	$ -
3	Service Technician	Hourly rate for one Service Technician.	21 man-hrs	x $_____/man-hr =	$ -	9 man-hrs	x $_____/man-hr =	$ -
4	Response time to any site for Reactive Maintenance call.	The NCC will reimburse a maximum equivalent to one hour at the Senior Service Technician rate for travel time from the Contractors place of business to any of the sites in this Contract.	1 man-hrs	x $_____/man-hr =	$ -			
5	Markup on any parts or materials required and approved by the NCC.	With the exception of Consumables (see 2.1.1), the NCC will pay a fixed percentage markup for any materials invoiced by the Contractor. Only materials for which a written estimate was provided will be subject to this provision.	$ 7,000	+ _____% mark up =	$ -	$ 3,000	+ _____% mark up =	$ -
				Total Regular Hours (A)	$ -		**Total Premium Hours (B)**	$ -

Total Regular Hours (A) PLUS Total Premium Hours (B) * $ -

*** Bidder to transmit the total of the SOA rates under section 4 of the Invitation to Tender - General Service (NR60) page 2 of 6**

Special considerations	Personnel supplied by the Contractor must respect the terms & conditions of the Contract (see 3.1)
	The premium hourly rate will apply only to work performed between the hours of 20:00 and 05:00 and work performed on Sundays. For the puposes of this Contract, Sunday will be deemed to begin at 05:00 and end at 20:00.
	The Contractor may not invoice the NCC for any more than one Senior Service Technician on any one site, at any one time.
	The NCC will **NOT** reimburse the Contractor for travel time following a Reactive Maintenance call.

Company name: _____

Signature: _____ Date: _____

*estimated quantities for bid evaluation purposes only
Appendix 7-A-2 must be completed in its entirety
All applicable taxes are extra to the rates quoted above.

BID BOND FORM

	Bond Number		
	Amount	$	

KNOW ALL MEN BY THESE PRESENTS, that _____ as Principal, hereinafter called the Principal, and _____ as Surety, hereinafter called the Surety, are, subject to the conditions hereinafter contained, held and firmly bound unto the National Capital Commission as Obligee, hereinafter called the NCC, In the amount of _____ dollars ($ _____), lawful money of Canada, for the payment of which sum, well and truly to be made, the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

SIGNED AND SEALED this _____ day of _____ , _____ . WHEREAS, the Principal has submitted a written tender to the NCC, dated the _____ day of _____ , _____ , for: _____ .

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION are such that if:

(a) The Principal, should his tender be accepted within the period be specified by the NCC, or, if no period be specified, within sixty (60) days after closing date of the tender:

1. does execute within a period specified by the NCC, or, if no period be specified therein, within fourteen (14) days after the prescribed forms are presented to him for signature, execute such further Contractual documents, if any, as may be required by the terms of the tender as accepted; and does

2. furnish a Performance Bond and a Labour and Material Payment Bond, each in the amount of 50% of the Contract price and satisfactory to the NCC, or other security acceptable to the NCC; or

(b) the Principal does pay to the NCC the difference between the amount of the Principal's tender and the amount of the Contract entered into by the NCC for the work, supplies and services which were specified in the said tender, if the latter amount be in excess of the former,

then, this obligation shall be void; otherwise it shall remain in full force and effect.

PROVIDED, HOWEVER, that the Surety and the Principal shall not be liable to the NCC for an amount greater than the amount specified in the bond.

PROVIDED FURTHER that the Surety shall not be subject to any suit or action unless such suit or action is instituted and process therefore served upon the Surety at its Head Office in Canada, within twelve (12) months from the date of this bond.

IN TESTIMONY WHEREOF, the Principal has hereto set its hand and affixed its seal, and the Surety has caused these presents to be sealed with its corporate seal duly attested by the signature of its authorized signing authority, the day and first above written.

SIGNED, SEALED AND DELIVERED in the presence of:			Note: Affix Corporate seal if applicable.
Principal			
Witness			
Surety			

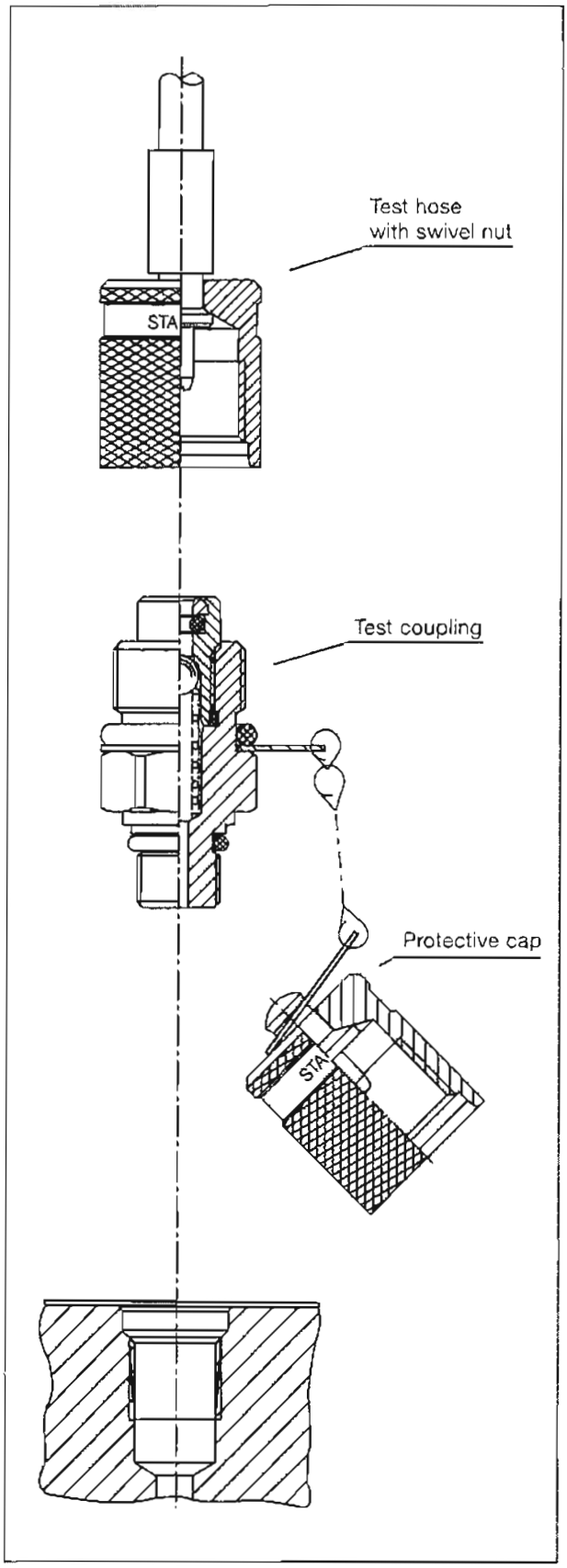
FRECO
FLUID
POWER

77 Auriga Drive, Unit 9
Nepean, Ont. K2E 7Z7
Tel : (613) 226-1201
Fax : (613) 723-7391

Additional Components

Parker

Test 20 Type SMK Connection Thread M 16 x 2



Fast Coupling for:

- Monitoring and control of pressure
- Venting
- Sampling Fluids

Advantages:

- Test system at working pressure
- Connection is leakproof before **ball check** is open
- Simple connection to measurement, control and switching devices
- Self locking metal protective cap
- Minimizes introduction of contamination into hydraulic systems

Working Pressure:

- Max. working pressure 9000 PSI (630 bar)
  For SMK style G, K and S the recommended working pressure of fitting manufacturer should be noted
- Connection under pressure up to 5800 PSI (400 bar) max.

Materials:

- Metal parts: Steel, Stainless Steel on request
- Ball: Stainless Steel
- Seals:

Standard
V = FPM-VITON Temperature range – 4°F to +392°F (– 20° C to + 200°C)

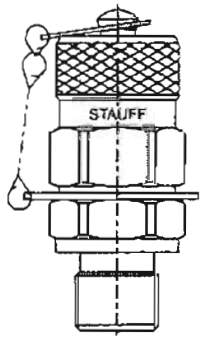
Optional
P = NBR-BUNA Temperature range – 4°F to +195°F (– 20° C to + 90° C)

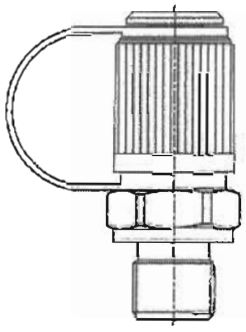
E = EPDM Ethylene Propylene (for Brake Fluid)
Temperature range – 40 F to +302°F (– 40° C to + 150° C)

- Hose, Polyamide Temperature range –31°F to +212°F (–35° C to +100° C)

Media:

- Suitable for hydraulic oils and other mineral based fluids (Check compatibility of seal material)
- For use with other liquid media, low viscosity media or gaseous media please consult STAUFF details
- SMK20 - 1/4" NPT - VD-ETG version available for severe shock / vibration applications

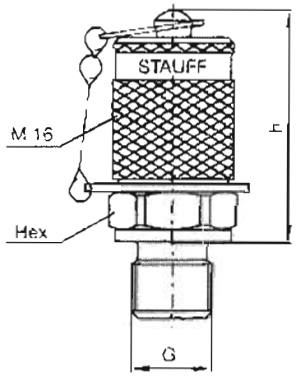


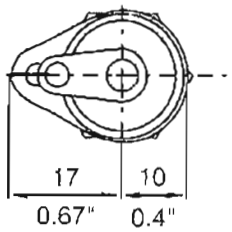


The complete STAUFF-TEST-20-Type-SMK range is also available with hexagonal protection cap made of steel or plastic protection cap

Test 20 Type SMK Connection Thread M 16 x 2

Test Coupling with Protective Cap SMK



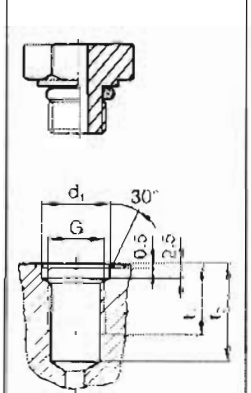


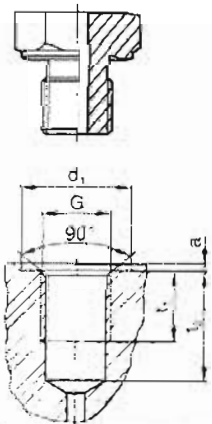
Thread G	h mm / in	Hex mm / in	Order No. NBR (BUNA)	Order No. FPM (VITON) (Standard)	Seal Type (see below)
M 8 x 1	37 / 1.46	17 / 0.67	SMK 20 – M 8 x 1 – PA	**SMK 20 – M 8 x 1 – VA**	O-Ring Type A
M 10 x 1	37 / 1.46	17 / 0.67	SMK 20 – M 10 x 1 – PA	**SMK 20 – M 10 x 1 – VA**	O-Ring Type A
M 12 x 1,5	37 / 1.46	17 / 0.67	SMK 20 – M 12 x 1.5 – PC	**SMK 20 – M 12 x 1.5 – VC**	O-Ring Type C
M 14 x 1,5	37 / 1.46	19 / 0.75	SMK 20 – M 14 x 1.5 – PB	**SMK 20 – M 14 x 1.5 – VB**	Metal Joint Type B
M 16 x 1,5	37 / 1.46	22 / 0.87	SMK 20 – M 16 x 1.5 – PB	**SMK 20 – M 16 x 1.5 – VB**	Metal Joint Type B
G 1/8	39 / 1.54	17 / 0.67	SMK 20 – G 1/8 – PC	**SMK 20 – G 1/8 – VC**	O-Ring Type C
G 1/4	37 / 1.46	19 / 0.75	SMK 20 – G 1/4 – PB	**SMK 20 – G 1/4 – VB**	Metal Joint Type B
G 1/4	37 / 1.46	19 / 0.75	SMK 20 – G 1/4 – PC	**SMK 20 – G 1/4 – VC**	O-Ring Type C
G 3/8	37 / 1.46	22 / 0.87	SMK 20 – G 3/8 – PB	**SMK 20 – G 3/8 – VB**	Metal Joint Type B
R 1/8 taper	37 / 1.46	17 / 0.67	SMK 20 – R 1/8 K-PD	**SMK 20 – R 1/8 K-VD**	Taper Type D
R 1/4 taper	36 / 1.42	17 / 0.67	SMK 20 – R 1/4 K-PD	**SMK 20 – R 1/4 K-VD**	Taper Type D
1/8 NPT	36 / 1.42	17 / 0.67	SMK 20 – 1/8 NPT-PD	**SMK 20 – 1/8 NPT-VD**	Taper Type D
1/4 NPT	35 / 1.38	17 / 0.67	SMK 20 – 1/4 NPT-PD	**SMK 20 – 1/4 NPT-VD**	Taper Type D
7/16 – 24 UNF	38 / 1.50	17 / 0.67	SMK 20 – 7/16 UNF-PE	**SMK 20 – 7/16 UNF-VE**	O-Ring Type E
7/16 – 20 UNF	38 / 1.50	17 / 0.67	SMK 20 – 7/16 UNF-PE	**SMK 20 – 7/16 UNF-VE**	O-Ring Type E
1/2 – 20 UNF	38 / 1.50	17 / 0.67	SMK 20 – 1/2 UNF-PE	**SMK 20 – 1/2 UNF-VE**	O-Ring Type E
9/16 – 18 UNF	37 / 1.46	19 / 0.75	SMK 20 – 9/16 UNF-PE	**SMK 20 – 9/16 UNF-VE**	O-Ring Type E
3/4 – 16 UNF	37 / 1.46	19 / 0.75	—	**SMK 20 – 3/4 UNF-VE**	O-Ring Type E

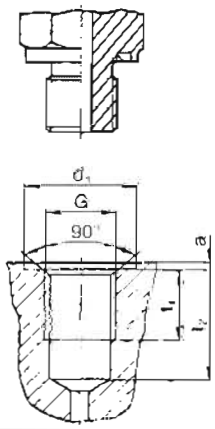
To order hexagonal protection cap, add "SK" to part number. To order Plastic Protection cap, add "KK" to part number.
Other port connections and seals on request.

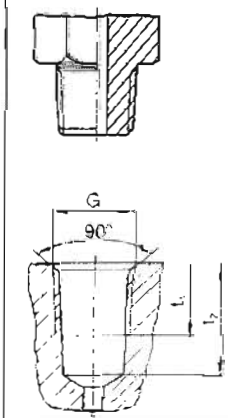
Port Connections and Seals

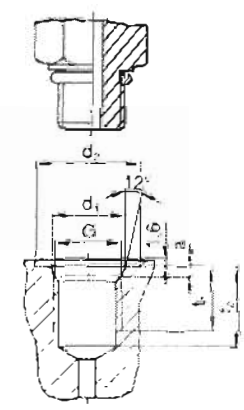
Type A	Type B	Type C	Type D	Type E (ISO 6149)











G	d1 mm / in	t1 mm / in	t2 mm / in
M 8 x 1	9.5 / 0.37	11 / 0.43	16.5 / 0.65
M 10 x 1	11.5 / 0.45	12 / 0.47	16.5 / 0.65
M 10 x 1.25	11.5 / 0.45	12 / 0.47	16.5 / 0.65

G	d1 mm / in	t1 mm / in	t2 mm / in	a mm / in
M 14 x 1,5	20 / 0.79	12 / 0.47	18.5 / 0.73	1.5 / 0.06
M 16 x 1,5	22 / 0.87	12 / 0.47	18.5 / 0.73	1.5 / 0.06
G 1/4	20 / 0.79	12 / 0.47	18.5 / 0.73	1.5 / 0.06
G 3/8	23 / 0.91	12 / 0.47	18.5 / 0.73	2 / 0.08

G	d1 mm / in	t1 mm / in	t2 mm / in	a mm / in
M 12 x 1,5	18 / 0.71	12 / 0.47	18.5 / 0.73	1.5 / 0.06
G 1/4	15 / 0.59	8 / 0.31	13 / 0.51	1.0 / 0.04
G 3/8	19 / 0.75	12 / 0.47	18.5 / 0.73	1.5 / 0.06

G	t1 mm / in	t2 mm / in
R 1/8 taper	5.5 / 0.22	9.5 / 0.37
R 1/4 taper	8.5 / 0.33	13.5 / 0.53
1/4 NPT	8.9 / 0.27	11.8 / 0.46
1/4 NPT	10 / 0.39	16.5 / 0.65

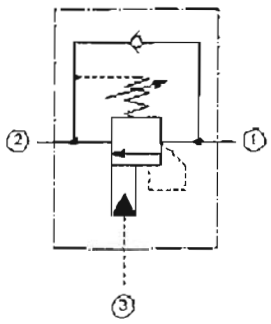
G	d1 mm / in	d2 mm / in	t1 mm / in	t2 mm / in	a mm / in
7/16 – 24 UNF	9.1 / 0.36	12.4 / 0.49	11 / 0.43	16 / 0.63	1.4 / 0.06
7/16 – 20 UNF	9.1 / 0.36	12.4 / 0.49	11 / 0.43	16 / 0.63	1.4 / 0.06
1/2 – 20 UNF	11.5 / 0.45	15.8 / 0.62	11.5 / 0.45	16 / 0.63	1.4 / 0.06
9/16 – 18 UNF	14 / 0.55	18.3 / 0.72	14 / 0.55	16 / 0.63	1.4 / 0.06
3/4 – 16 UNF	15.5 / 0.61	20.6 / 0.81	15.5 / 0.61	16 / 0.63	2.4 / 0.10

3:1 pilot ratio, standard capacity counterbalance valve

Capacity:
30 gpm (120 L/min.)

Functional Group:
Products : Cartridges : Counterbalance : 3-Port Non-vented : Standard, 3:1 Pilot Ratio

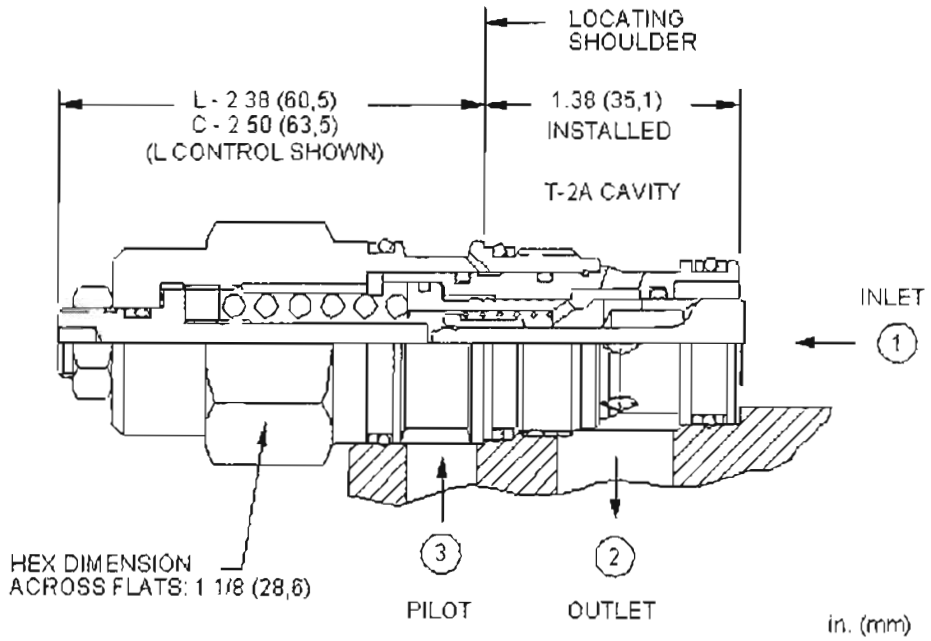
Model:
CBEA



Product Description

Counterbalance valves with pilot assist are meant to control an overrunning load. The check valve allows free flow from the directional valve (port 2) to the load (port 1) while a direct-acting, pilot-assisted relief valve controls flow from port 1 to port 2. Pilot assist at port 3 lowers the effective setting of the relief valve at a rate determined by the pilot ratio.

Other names for this valve include motion control valve and over center valve.



in. (mm)

Technical Features

- Counterbalance valves should be set at least 1.3 times the maximum load induced pressure.
- Full clockwise setting is less than 200 psi (14 bar).
- Reseat exceeds 85% of set pressure
- Turn adjustment clockwise to decrease setting and release load.
- Backpressure at port 2 adds to the effective relief setting at a ratio of 1 plus the pilot ratio times the backpressure.
- Sun counterbalance cartridges can be

when the valve is standard set. Settings lower than the standard set pressure may result in lower reseat percentages.

- Two check valve cracking pressures are available. Use the 25 psi (1,7 bar) check unless actuator cavitation is a concern.

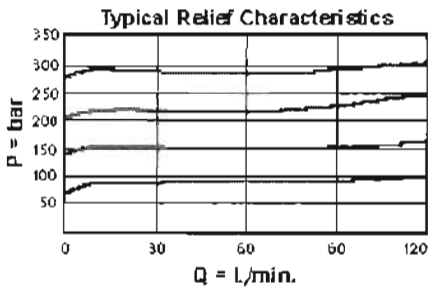
- All 3-port counterbalance, load control, and pilot-to-open check cartridges are physically interchangeable (i.e. same flow path, same cavity for a given frame size).

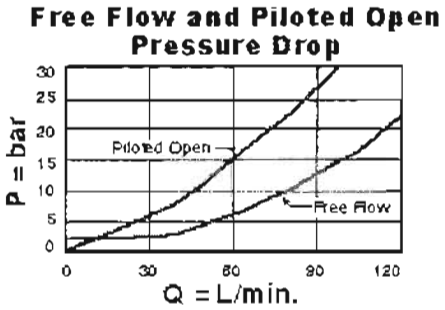
installed directly into a cavity machined in an actuator housing for added protection and improved stiffness in the circuit.

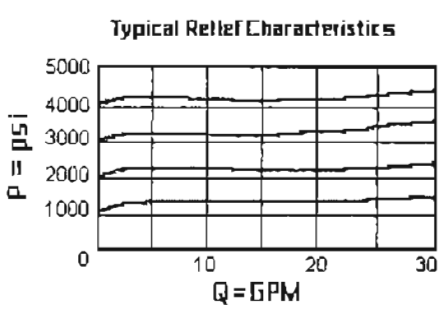
- This valve does not have positive seals on the pilot section and will pass up to 2 in/min.@1000 psi (32 cc/min.@70 bar) between port 2 and port 3. This is a consideration in master-slave circuits and in the leak testing of valve-cylinder assemblies.
- Incorporates the Sun floating style construction to eliminate the effects of internal parts binding due to excessive installation torque and/or cavity/cartridge machining variations.

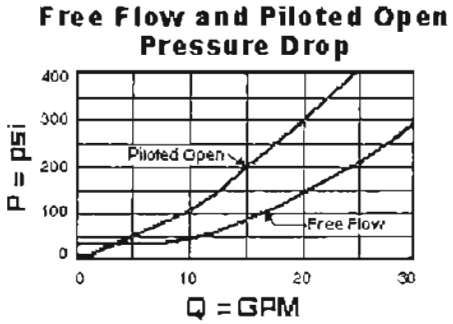
Technical Data

	U.S. Units	Metric Units
Cavity	T-2A	
Capacity	30 gpm	120 L/min.
Pilot Ratio	3:1	3:1
Load Holding Units	3075 psi	215 bar
Load Holding Valve Setting Units	4000 psi	280 bar
Adjustment - Number of Counterclockwise Turns to Increase Setting	3.75	3.75
Factory Pressure Settings Established at	2 in/min.	30 cc/min.
Maximum Valve Leakage at Reseat	5 drops/min.	0,4 cc/min.
Reseat	>85% of Set Pressure	>85% of Set Pressure
Valve Hex Size	1 1/8 in.	28,6 mm
Valve Installation Torque	45 - 50 lbf ft	60 - 70 Nm
Adjustment Screw Hex Socket Size	5/32 in.	4 mm
Adjustment Nut Hex Size	9/16 in.	15 mm
Adjustment Nut Torque	108 lbf in.	12 Nm
Model Weight	.60 lb	0,30 kg
Seal Kits	Buna: 990-202-007	
Seal Kits	Viton: 990-202-006	









Option Selection

CBEA-L H N

Preferred Options

Control	*Functional Setting Range*	*External Material/Seal Material*
L Standard Screw Adjustment	**H** 1000 - 4000 psi w/25 psi Check (70 - 280 bar w/1,7 bar Check), 3000 psi (210 bar) Standard Setting	**N** Buna-N

Standard Options

C* Tamper Resistant - Factory Set	**A** 1000 - 4000 psi w/4 psi Check (70 - 280 bar w/0,3 bar Check), 3000 psi (210 bar) Standard Setting	**V** Viton
	B 400 - 1500 psi w/4 psi Check (30 - 105 bar w/0,3 bar Check), 1000 psi (70 bar) Standard Setting	
	I 400 - 1500 psi w/25 psi Check (30 - 105 bar w/1,7 bar Check), 1000 psi (70 bar) Standard Setting	

Customer specified setting stamped on hex +$1.10

*Special Setting required, specify at time of order

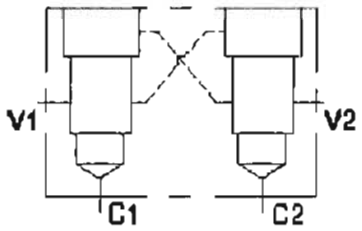
Functional Group:

Products : Manifolds : Line mount : Counterbalance : 3 Port : Cross pilot

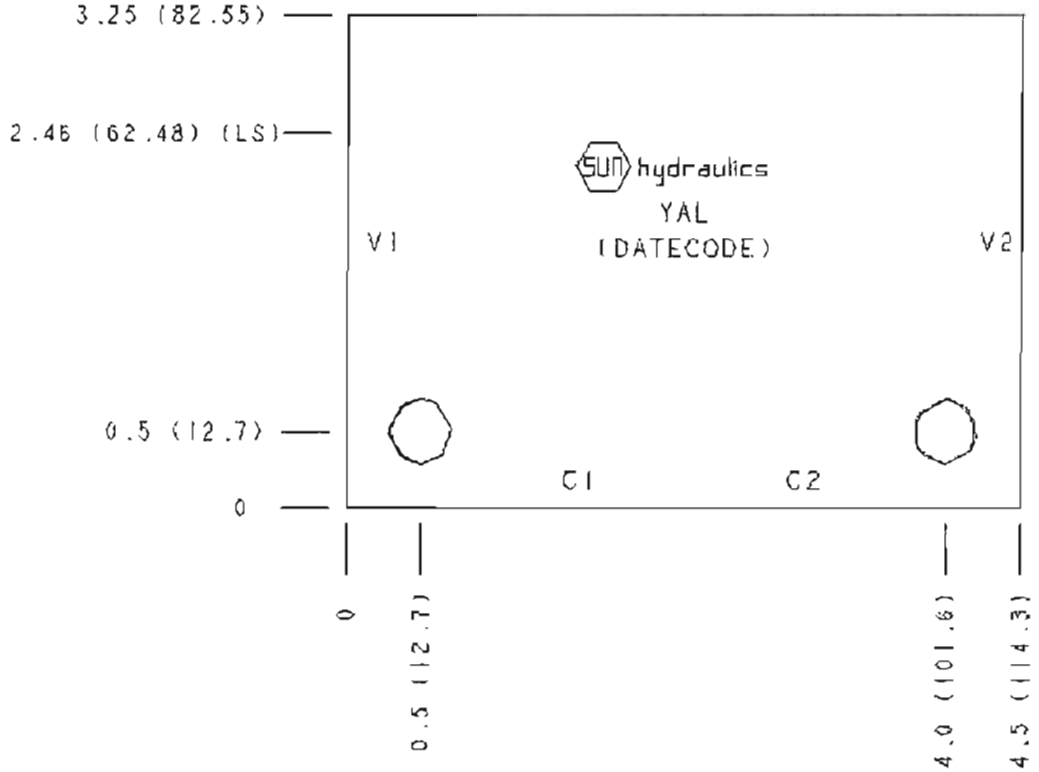
Model:

YAL

Aluminum Body Pressure Rating: **3000 psi (210 bar)**
Ductile Iron Body Pressure Rating: **5000 psi (350 bar)**



Face : 6



Cartridge extension measurement is to the centerline of the cartridge.

Port Headings and Sizes:

All Ports

SAE 12

Technical Data

	U.S. Units	Metric Units

Cavity	T-2A	
Body Features	Cross pilot	Cross pilot
Body Type	Line mount	Line mount
Interface	None	None
Number of Cavities	2	

Option Selection:

Model Code	Description
YAL	Aluminum
YAL/S	Iron

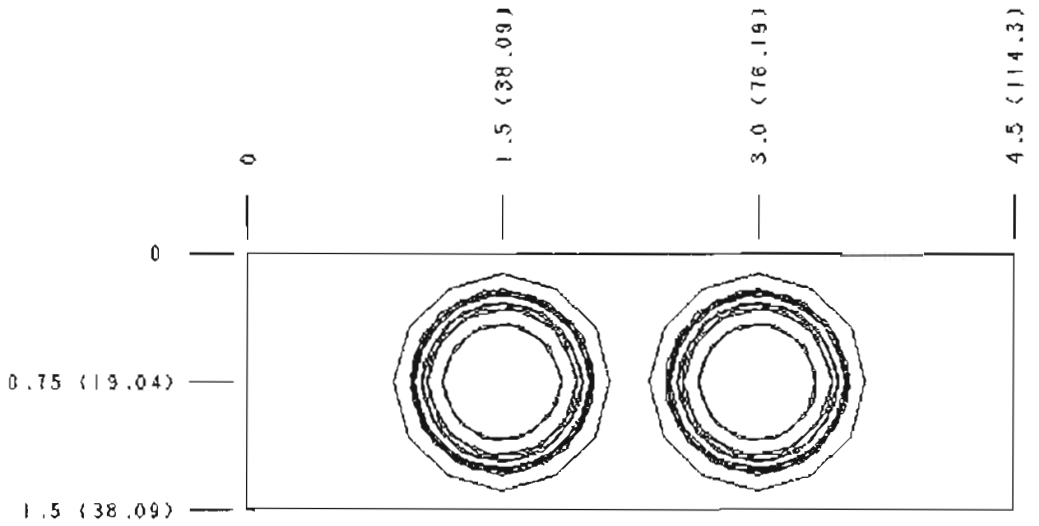
Special Notes :

No Special Notes available for selected Model.

Functional Group:
Products : Manifolds : Line mount : Counterbalance : 3 Port : Cross pilot

Model:
YAL

Face : 2

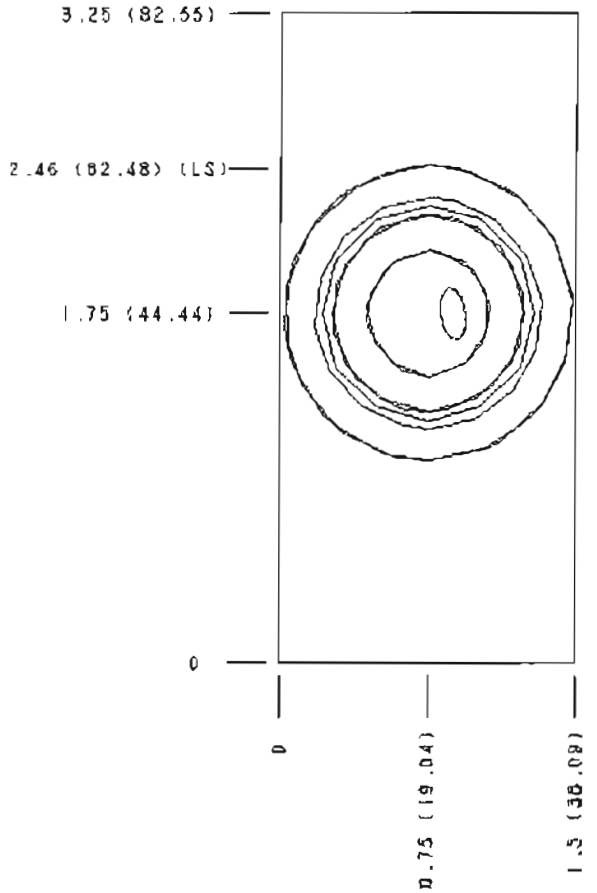


Cartridge extension measurement is to the centerline of the cartridge.

Functional Group:
Products : Manifolds : Line mount : Counterbalance : 3 Port : Cross pilot

Model:
YAL

Face : 5

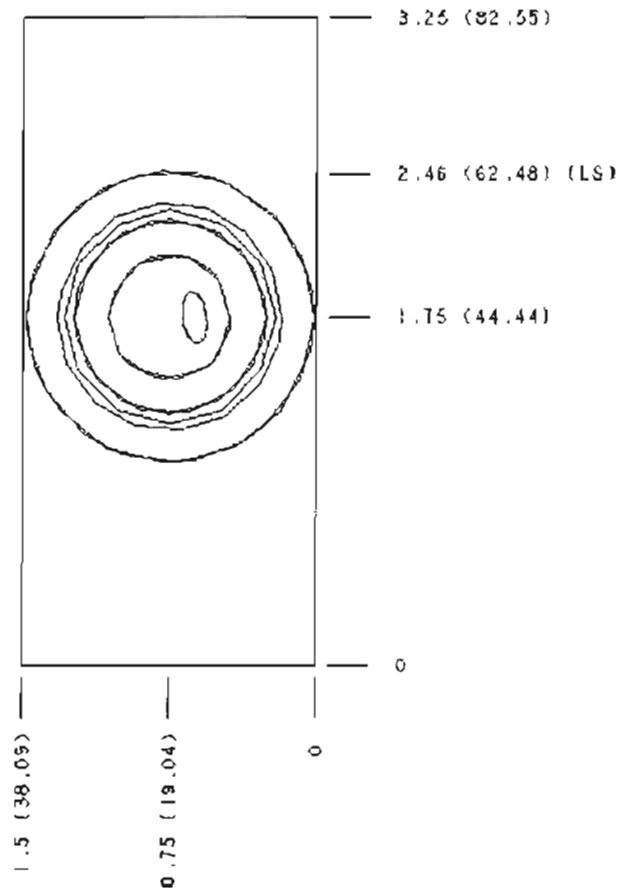


Cartridge extension measurement is to the centerline of the cartridge.

Functional Group:
Products : Manifolds : Line mount : Counterbalance : 3 Port : Cross pilot

Model:
YAL

Face : 7

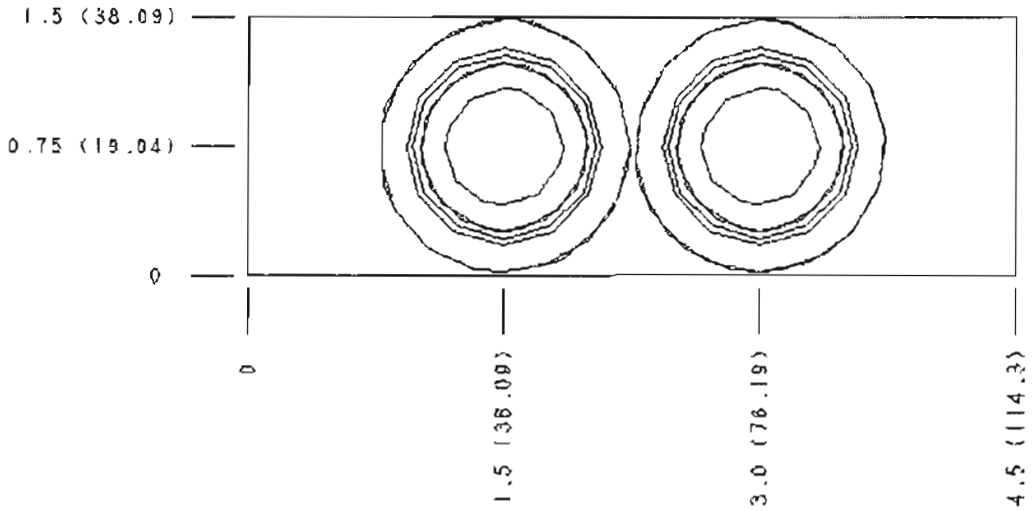


Cartridge extension measurement is to the centerline of the cartridge.

Functional Group:
Products : Manifolds : Line mount : Counterbalance : 3 Port : Cross pilot

Model:
YAL

Face : 10



Cartridge extension measurement is to the centerline of the cartridge.

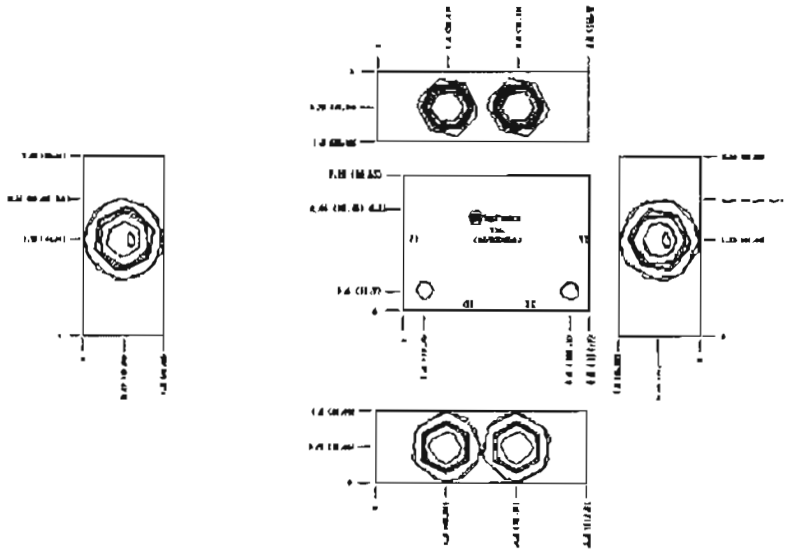
Functional Group:

Products : Manifolds : Line mount : Counterbalance : 3
Port : Cross pilot

Model:
YAL

Projection Type

All Dimensions in Inches(mm)



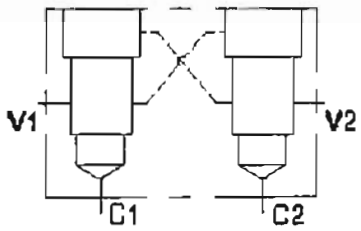
Functional Group:

Products : Manifolds : Line mount : Counterbalance : 3 Port : Cross pilot

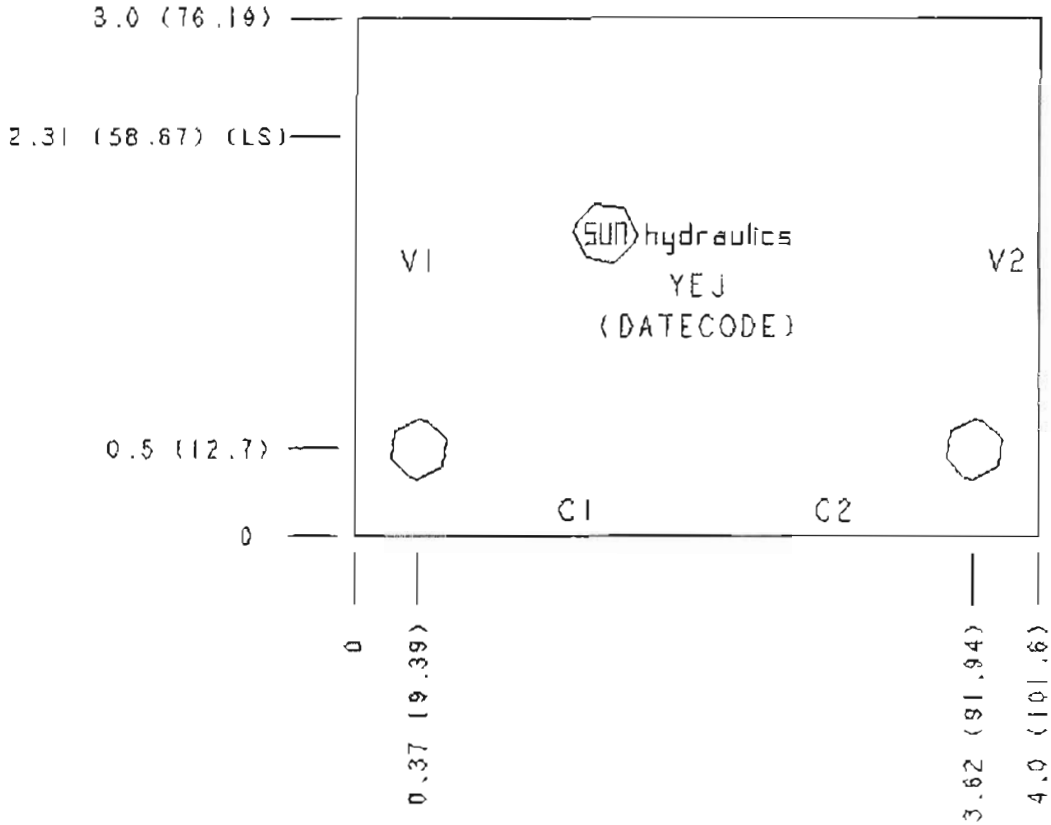
Model:

YEJ

Aluminum Body Pressure Rating: **3000 psi (210 bar)**
Ductile Iron Body Pressure Rating: **5000 psi (350 bar)**



Face : 6



Cartridge extension measurement is to the centerline of the cartridge.

Port Headings and Sizes:

All Ports

SAE 8

Technical Data

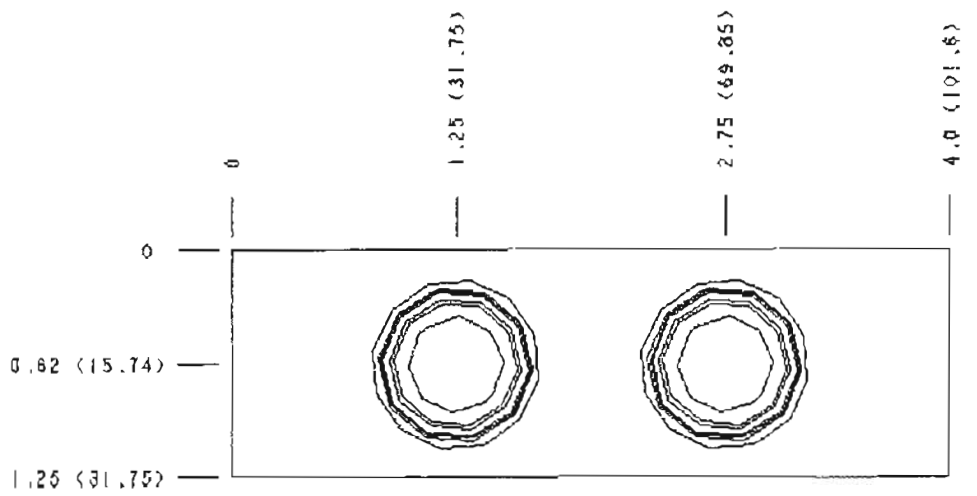
	U.S. Units	Metric Units
Cavity	T-11A	
Body Features	Cross pilot	Cross pilot
Body Type	Line mount	Line mount
Interface	None	None
Number of Cavities	2	
Mounting Hole Diameter	.34 in.	8.6 mm
Mounting Hole Depth	Through	Through
Mounting Hole Quantity	2	2

Option Selection:

Model Code	Description
YEJ	Aluminum
YEJ/S	Iron

Special Notes :

No Special Notes available for selected Model.

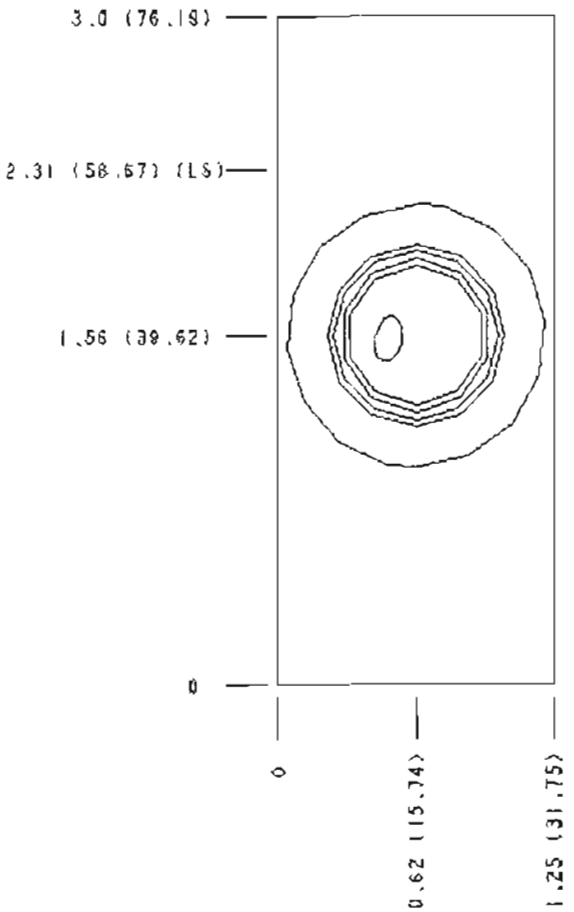


Cartridge extension measurement is to the centerline of the cartridge.

Functional Group:
Products : Manifolds : Line mount : Counterbalance : 3 Port : Cross pilot

Model:
YEJ

Face : 5

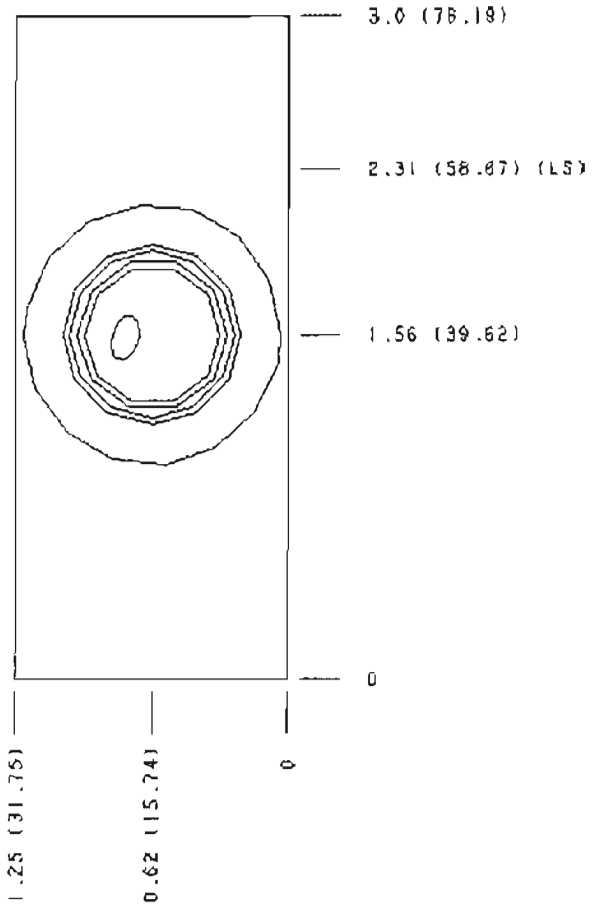


Cartridge extension measurement is to the centerline of the cartridge.

Functional Group:
Products : Manifolds : Line mount : Counterbalance : 3 Port : Cross pilot

Model:
YEJ

Face : 7

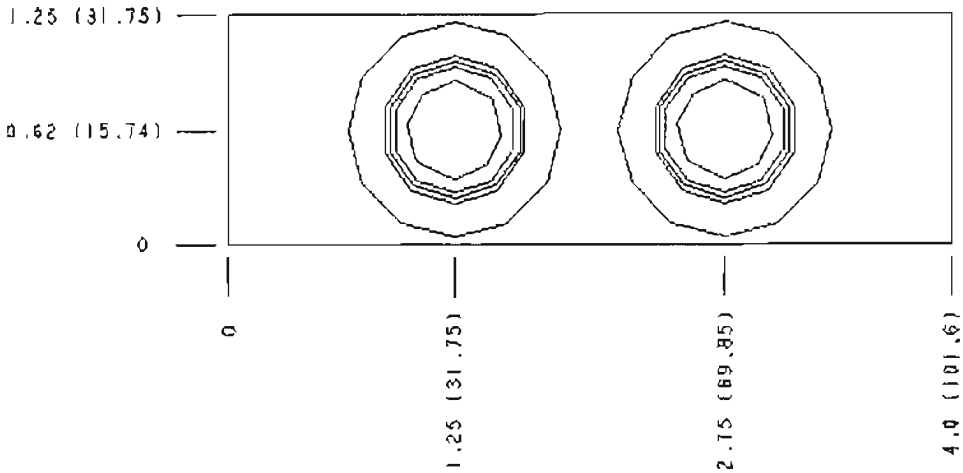


Cartridge extension measurement is to the centerline of the cartridge.

Functional Group:
Products : Manifolds : Line mount : Counterbalance : 3 Port : Cross pilot

Model:
YEJ

Face : 10



Cartridge extension measurement is to the centerline of the cartridge.

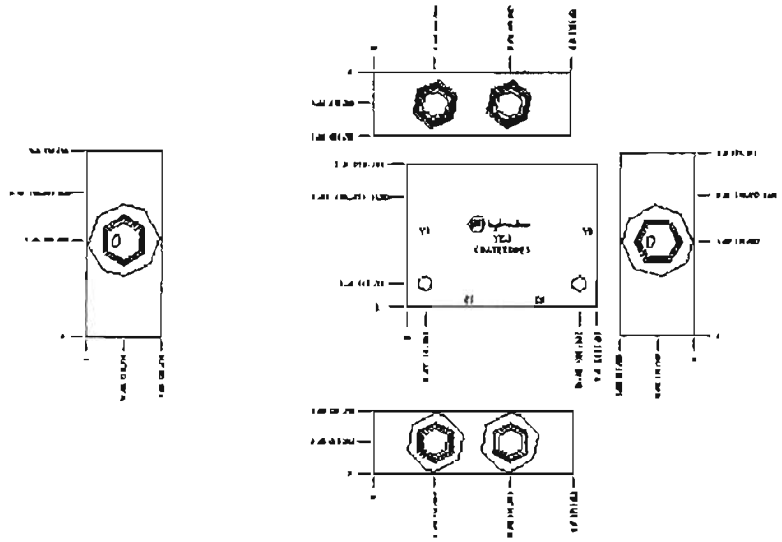
Functional Group:

Products : Manifolds : Line mount : Counterbalance : 3
Port : Cross pilot

Model:
YEJ

Projection Type

All Dimensions in Inches(mm)



Performance Data

A deceleration valve is a cam operated two-way valve with a tapered spool. As the cam depresses the plunger, flow through the valve is gradually decreased to the cut-off point.

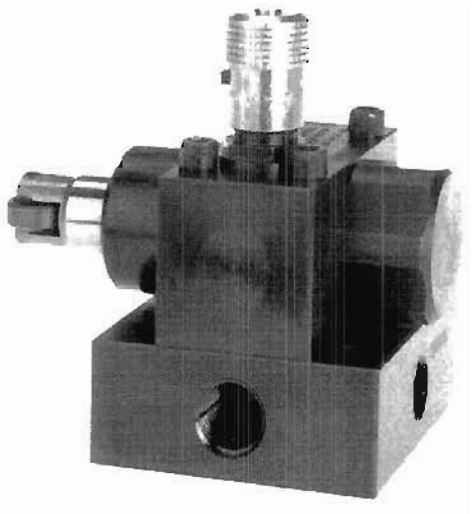
This valve is also available as a normally closed, cam operated, two-way valve.

MAXIMUM PRESSURE
3000 PSI (210 Bar)

MAXIMUM FLOW
See flow vs. pressure drop curves, reverse flow vs. pressure drop, flow vs. plunger travel curves and

NOMINAL FLOW
D600 10 GPM (37.9 Bar)
D1200 35 GPM (132.5 Bar)

PORT CONFIGURATIONS
See dimensional drawings and/or ordering information for configuration availability.



Quick Reference Data Chart

Valve Model	Flow, max., GPM (L/M)	Pressure Drop △P @ (Max.) PSI (Bar) (Plunger Full Open)	Mounting	Port Size	Subplate Port Location
D600	19 (72)	200 (14)	Inline	3/8 NPTF	—
DC600	19 (72)	200 (14)	Inline	3/8 NPTF	—
DF600	19 (72)	200 (14)	Inline	3/8 NPTF	—
DN600	19 (72)	200 (14)	Inline	3/8 NPTF	—
DNS600	19 (72)	200 (14)	Subplate	3/8 NPTF	Side
DS600	19 (72)	200 (14)	Subplate	3/8 NPTF	Side
D1200	60 (227)	120 (8)	Inline	3/4 NPTF	—
DC1200	60 (227)	120 (8)	Inline	3/4 NPTF	—
DF1200	60 (227)	120 (8)	Inline	3/4 NPTF	—
DFS1200	60 (227)	120 (8)	Subplate	3/4 NPTF	Bottom
DN1200	60 (227)	120 (8)	Inline	3/4 NPTF	—
DNS1200	60 (227)	120 (8)	Subplate	3/4 NPTF	Bottom
DS1200	60 (227)	120 (8)	Subplate	3/4 NPTF	Bottom
DCS1200	60 (227)	120 (8)	Subplate	3/4 NPTF	Bottom

K

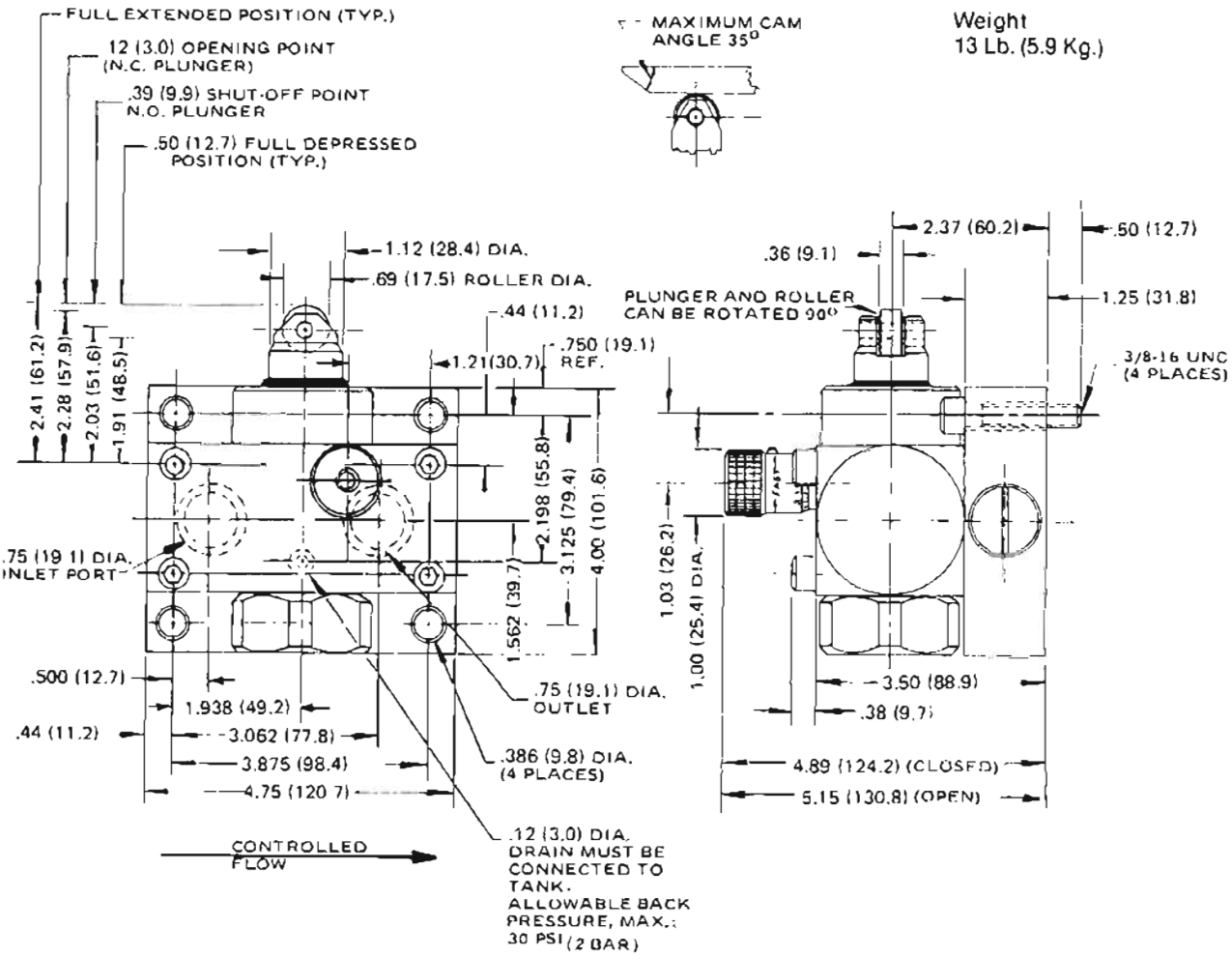
Reverse Flow

Valve Model	With Check GPM (L/M)	With Needle	With Check & Needle GPM (L/M)	Flow Path
D**600S**	19 (72)	N.O. or N.C. valve reverse flow is proportional to needle setting	19 (72)	Normally Open or Closed
D**1200S**	60 (227)		60 (227)	Normally Open or Closed

Dimensions

Model DFS1200S

Manifold-mounted Deceleration Valve with reverse check and bypass needle



1. WORKING PRESSURE, MAX., 3000 PSI (210 Bar)
2. DRAIN: MAX. ALLOWABLE BACK PRESSURE: 30 PSI (2 Bar)
3. FORCE TO DEPRESS PLUNGER 50 Lbs. (22.8 Kg.) (DRAIN PRESSURE INCREASES FORCE REQ'D TO DEPRESS PLUNGER.)

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Nepean, Ont. K2E 7Z7
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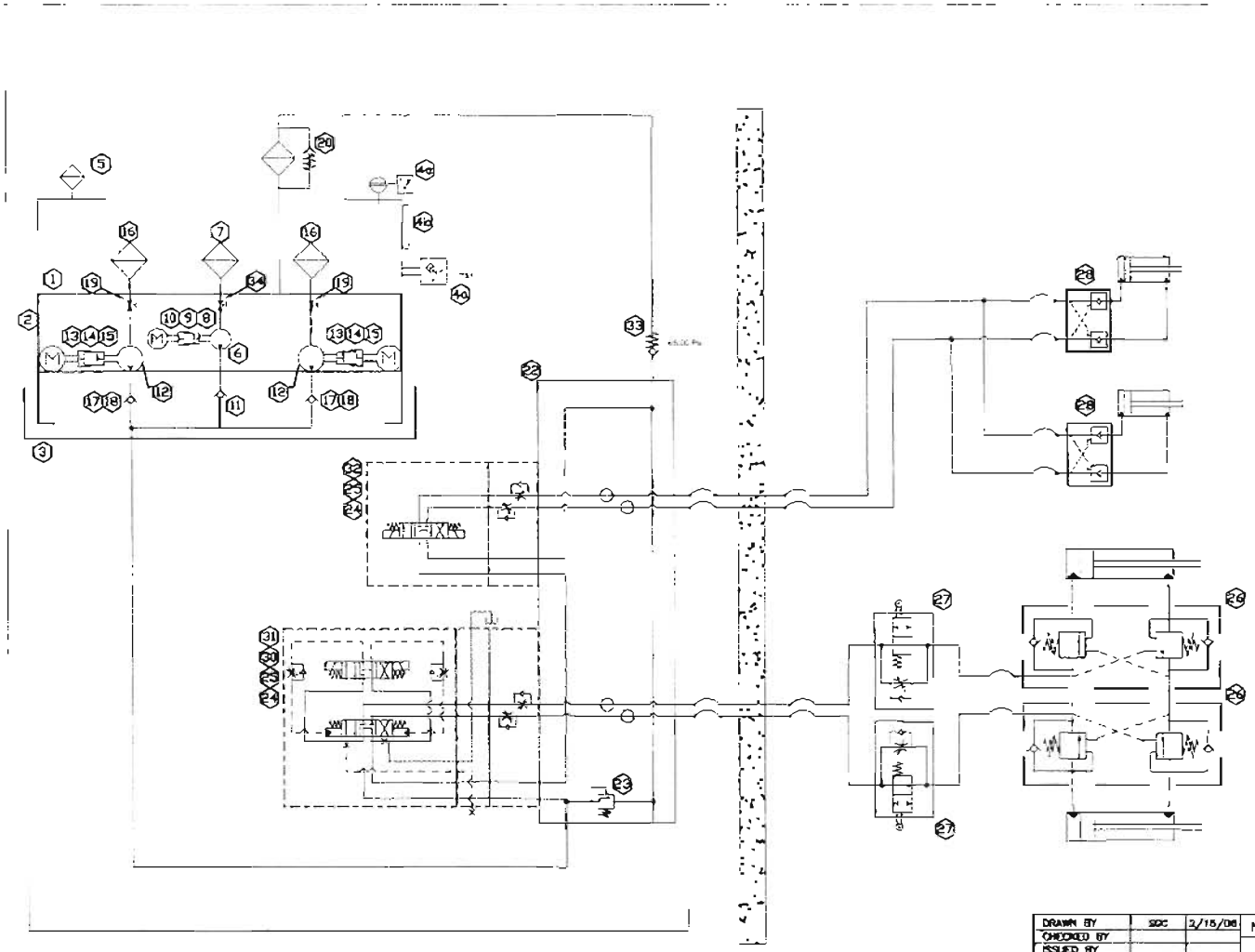
Fax : (613) 723-7391

B.O.M. And Schematics

Parker Hydraulics

Item#	Qty	Part #	Description
1	1	TRL-50	Reservoir, 50 Gallon
2	1	TWCS-50-MOD	Reservoir, Stand
3	1	TDP-60-9.5" Custom	Reservoir, Drip Tray
4a	1	SLTS181582N16G115	Level,Temp switch
4b	1	SNA127BST	Level Gauge
5	1	SES3-40-S80	Filler/Breather
6	1	F3-V10-1-1 RH, Viton	Pump, 1.46 GPM
7	1	TFS-100-0	Strainer
8a	1	M10010408	Coupling 1/2
8b	1	M10002406	Coupling 1/2
8c	1	M170-U9	Insert
9	1	M182472A	Bell Housing
10a	1	131541	Electric Motor, 2HP, Single Ø
10b	1	175691	C-Face
11	1	C620S-V	Check Valve
12	2	F3-20V-05-1 RH, Viton	Pump, 7.3 GPM
13a	2	G150212	Electric Motor, 10HP, 3 Ø
13b	2	175068	C-Face
14a	2	M20011210	Coupling 1/2
14b	2	M20002806	Coupling 1/2
14c	2	M270-U9	Insert
15	2	M182582B	Bell Housing
16	2	TFS-120-0	Strainer
17	2	C1220S-V	Check Valve
18	2	SP46-12-12	Code 61 Adapter for check
19a	2	2BVL-21-24-B	Ball Valves
19b	2	HA-24	Ball Valve adapter
19c	2	SAS-24	Ball Valve adapter
20a	1	50AT210CN25OOH	Filter, 10µm filter
20b	1	CI-20	Filter gauge
21	1	SPG-63-3000-S	Gauge
22	1	BA05GSH02SFUEAAA	Manifold
23	1	RPGC-LAV	Relief Valve
24	2	BK	Bolt Kit
25	2	FM3DDKV	Flow Control
26a	4	CBEA-LHV	Counterbalance Valve
26b	2	YAL	#12 SAE bodies
27	2	DFS1200SV	Deceleration valves
28a	4	CKCB-XCV	PO check valves
28b	2	YEJ	#8 SAE bodies
29a	1	SMK20-7/16-UNF-VE	Sample test port
29b	1	SMS20-024B	Sample test port hose
30	1	VAA05D05HABUESC	X & Y Valve adapter plate
31	1	D31VW008C1VYWH3A	D05H directional valve
32	1	D3W008CVYWFH	D05 standard directional valve
33	1	C1220S65	Check Valve
34	1	2BVL-20-16-B	Ball Valve
	0	1JS71-12-12,772TC-12	Hoses
	0	1JS71-8-8,772TC-8	Hoses



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32	1	D3W008CVYWFH	D05 standard directional valve
33	1	C1220S65	Check Valve
34	1	2BVL-20-16-B	Ball Valve
	0	1JS71-12-12.772TC-12	Hoses
	0	1JS71-8-6.772TC-8	Hoses

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FREDD FLUID POWER INC.

HOGS BACK BRIDGE

HYDRAULIC UNIT SCHEMATIC

DWG NO. 21506-TESC-1 | SHEET 1 OF 1 | SIZE D | REV.

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www.frecofluidpower.com

Hogs Back Custom Power Unit

1. B.O.M. and Schematics
2. Start Up Information
3. Reservoir Information
4. Pump and Electric Motor Information
5. Valve Information
6. Additional Components
7. Maintenance Information

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Maintenance Information

Table of Contents

WARNING

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

Introduction

This manual provides descriptive operation and maintenance instructions for standard Hydraulic Power Units manufactured by the Parker Hannifin Corporation. Any additional information may be obtained from Parker by referencing the Unit's Model Number and Serial Number stamped on the Reservoir Nameplate, or by contacting your local authorized Parker Distributor.

Some of the Information in this manual may not apply to your power unit. Information on custom units may require service and application information from other sources.

Warning

It is imperative that personnel involved in the installation, service, and operation of the power unit be familiar with how the equipment is to be used. They should be aware of the limitations of the system and its component parts; and have knowledge of good hydraulic practices in terms of safety, installation, and maintenance.

Description

The standard Hydraulic Power Unit usually consists of a JIC, "L" shaped, or vertical reservoir all of which incorporate sump drain, oil level gage, filler/breather assembly and spare return connections.

The pump will be coupled to the motor using either an integral close coupled configuration or flexible shaft coupling.

Customer type power units may have heat exchangers for oil cooling; pressure or return filters, oil immersion heaters, directional valves, and other pressure and flow control valves, or monitoring instrumentation.

Preparation For Use

Unpacking and Checking

The Power unit is mounted on skids and carefully packed for shipment. Do not remove it from the skid until it has been carefully checked for damage that may have occurred in transit. Report all damage immediately to the carrier and send a copy to the vendor. All open ports on the Power Unit were plugged at the factory to prevent the entry of contamination. These plugs must not be removed until just before piping connections are made to the unit.

Storage

If the Power Unit is not going to be installed immediately, it should be stored indoors, covered with waterproof sheet, and all open ports plugged. If long term storage is expected (6 months or more) we recommend filling the reservoir completely with clean hydraulic fluid to prevent the entry of moisture.

Removing from Shipping Skids

Vertical Power Units should be removed from the skid by wrapping a heavy duty nylon strap around the base of the motor mounting feet. This strap should be firmly secured to the lift truck forks when unit is lifted.

Small horizontal style Power Units should be moved with a fork0-lift truck, with 2 x 4 boards under the reservoir belly, to distribute and steady the load. Larger horizontal style Power Units have lifting holes in the reservoir end plates. Extra heavy 1 ½" pipes can be inserted into the lifting holes for allowing movement with a fork-lift truck. L-shaped reservoirs are provided with clearance and cross braces under the base plate for movement with a fork-lift truck.

Installation

Locating Power Unit

The unit should be installed indoors, and preferably in a clean, dry environment with an ambient temperature of 60 to 100°F. The unit can be installed outdoors if the reservoir was provided with optional weatherproof construction, and provisions were made for extreme temperature conditions. The reservoir can be secured to the floor or base using the four mounting holes located on the reservoir legs.

Service Connections

Water (If water cooled heat exchange has been provided) Connect the water supply to the inlet of the heat exchanger, with a shut-off valve and strainer (if not supplied by Parker). If a temperature Control Valve (Model WTC**) has been provided, it also should be installed on the inlet side. The outlet of the heat exchanger should be connected directly to the facility drain system. On single pass heat exchangers the water connections should be installed as shown below. On multi-pass heat exchanger the water flow direction is not important. (See fig. 1)

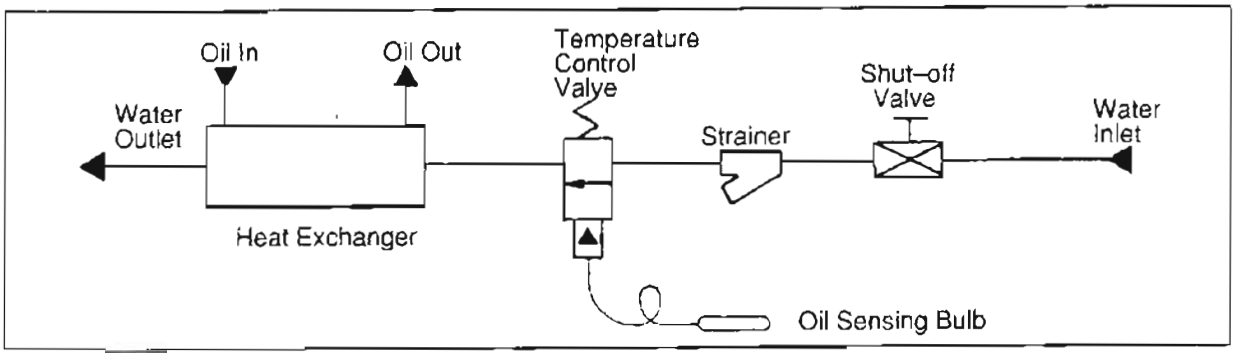


Figure 1

Service Connections (Cont.)

Electrical Connect the pump motor to the power source following the good practices as outlined in the National Electric Code and any local codes which may apply. Verify that the available voltage is the same as the voltage identified on the motor nameplate. Most motors have dual voltage ratings, so verify that the leads in the conduit box have been connected together as defined on the motor nameplate to match the facility power source available.

If Solenoid valves, pressure/temperature switches, or oil immersion heaters have been provided on the power unit, refer to the component name tag or other service information in this manual for operating voltage and ratings.

Supply and Return Connections

Complete all necessary interconnecting piping between the power unit and hydraulic actuators. The line sizes should be determined based on oil flow, operating pressure and allowable pressure dorp between the power unit and actuator.

Warning

Check to insure that the proper rated hose or pipe is used on pressure lines.

One of the key ingredients for good service and long life from a hydraulic system is cleanliness, and since most dirt infiltrates a hydraulic system during installation, we recommend the following:

a) All open ports on the power unit, cylinders, etc. must remain plugged with tape or plastic plugs until just before the hydraulic connections are made.

b) All interconnecting tubing, pipe, or hose should be clean, and free of rust, scale and dirt. The ends of all connectors should be plugged until just before they are to be installed in the system.

c) All openings in the reservoir such as the filler breather or access end covers holes must remain closed during installation.

d) If Teflon tape, or pipe dope is used, be sure it doesn't extend beyond the first thread of the pipe fitting.

Reservoir Filling

The reservoir must be filled with clean fluid thru the filler cap on the reservoir. The type of fluid must be compatible with the seals used on the power unit, and must comply with the recommendations of the manufacturers of the component parts.

Refer to the component manufacturer's catalog for fluid requirements. The cleanliness of the fluid going into the reservoir is very important, and in some cases, even new oil out of the drum is not adequate. We recommend that any fluid being transferred into the reservoir be done with the transfer pump with a 10 micron filter installed. A Parker filter cart is available for this purpose.

Start-Up Procedure

1) Open any ball or gate valve (if applicable) located in the pump suction line.

2) Back the system relief valve and/or pump pressure compensator adjustment knob out, so that the pressure will be near zero during the initial start.

Note:

If the Power unit has been provided with a variable displacement pump or any piston pump (v-Pak). the pump case should be filled with clean oil prior to priming. In most cases this can be accomplished by disconnecting the pump case drain line and pouring the oil into the pump case drain port.

Start-up Procedure (Cont.)

3) If the system has been provided with an open center directional valve, the oil during start-up will flow directly back to tank. If the system has a closed center valve, it may be necessary to loosen a fitting momentarily at the pump discharge, to bleed any air in the pump during the priming operation.

4) Jog the pump motor once, and verify that the pump is rotating in the same direction as the arrow tag on the pump case. If the direction is incorrect, reverse two (2) of the three (3) motor leads, and recheck the rotation.

5) Jog the pump/motor (3) to (6) times to prime the pump and allow the pump to run for several minutes at zero pressure. Check the piping for any leaks and correct immediately. (Leaks in fittings and tubing can be the result of vibration during shipping.)

6) Begin adjusting the relief valve and /or pump compensator to increase the pressure gradually. Note: on systems with open center directional valves, it will be necessary to actuate the valve to build pressure.

7) Continue increasing pressure until normal operating pressure is obtained, and recheck system for leaks. Lock adjustment screws in place.

Note
If the system has been provided with a pressure compensator pump and a relief valve, adjust the relief valve approximately 200 PSI higher than the compensator so that excessive heat is not generated by the relief valve.

8) During the start-up sequence, all filters should be monitored closely. Replace any filters element immediately, as soon as they begin to go into by-pass as indicated on the visual indicator.

9) After the entire system has been wetted with fluid, refill the reservoir to the normal operating level.

10) Verify that the cooling water to the heat exchanger (if applicable) is flowing. If the power unit has been provided with a water control valve (Model WTC**), and the oil temperature is exceeding 135°F, adjust the valve to increase the water flow.

Special Tools

All normal service and maintenance on standard power units can be accomplished with standard hand tools. No special tools are required.

General Maintenance

Electric Motors – Lubricate as recommended by the motor manufacturer.

Filters – Change or clean as required or as indicated on filters supplied with visual indicators. Make sure to check indicators shortly after start-up.

Suction Strainers – Should be cleaned after 10 hours of operation initially and every 100 hours thereafter. See appendices for cleaning instructions.

Reservoirs - Maintain oil level at all times. The oil should be checked after the first 100 hours and verify that the class of oil meets the requirements of the pump being used. Change the oil every 1000 to 2000 hours depending on the application and operation environment.

Comments – See component literature in appendices.

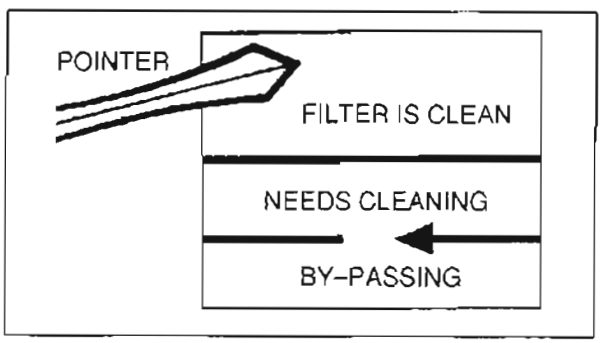
Recommended Spare Parts

Spare filter elements should be purchased with the power unit, and be available during the start-up operation. Other spare parts may be required, and are a function of the duty cycle of the hydraulic system, operation environment, and the acceptable down time of the equipment.

Preventive Maintenance

Filter Service

Filters must be maintained. The key to good filtration is filter maintenance. A machine may be equipped with the best filters available and they may be positioned in the system where they do the most good; but, it the filters are serviced and cleaned when dirty, the money spent for the filters and their installation has been wasted. A filter which gets dirty after one day of service and is cleaned 29 days later gives 29 days of non-filtered fluid. A filter can be no better than the maintenance provided.



Maintenance Suggestions

1) Set up a filter maintenance schedule and follow it diligently.
2) Inspect filter elements that have been removed from the system for signs of failure which may indicate that the service interval should be shortened and of impending system problems.
3) Never return to the system any fluid which has leaked out.
4) Always keep the supply of fresh fluid covered tightly.
5) Use clean containers, hoses, and funnels when filling the reservoir. Use a filter cart when adding oil is highly recommended.
6) Use common sense precautions to prevent entry of dirt into components that have been temporarily removed from the circuit.
7) Make sure that all clean-out holes, filter caps, and breather cap filters on the reservoir are properly fastened.
8) Do not run the system unless all normally provided filtration devices are in place.
9) Make certain that the fluid used in the system is of a type recommended by the manufacturers of the system or components.
10) Before changing from one type of fluid to another (e.g., from petroleum base oil to a fire resistant fluid), consult component and filter manufacturers in selection of the fluid and the filters that should be used. Also consult the publication "Recommended Practice for the use of Fire Resistant Fluids for Fluid Power Systems" published by the National Fluid Power Association.
11) Parker offers an oil sampling kit which can be used to ascertain the condition of the system fluid.

Maintaining Proper Oil Temperature

Hot oil in your equipment's hydraulic system is one of the primary causes of poor operation, component failure and downtime. Here are some pointers on maintaining proper oil temperature.

The oil in your hydraulic system was designed for operation within a specified temperature range. You may be able to run it at hotter temperatures for short periods of time, intermittently, without adverse effects. If you run continuously with oil that's too hot, your equipment will operate poorly causing key component failure and machine downtime.

"Hot oil" is a relative term. In most cases, 120°F at the reservoir is considered an ideal operating temperature. Always take an oil temperature reading at the reservoir, not at a component or any of the piping.

Some hydraulic systems are designed to operate at 130°F or higher. If you don't know the maximum operating temperature for your equipment, check your component manual for temperature and viscosity limitations.

How can you keep your equipment's hydraulic system from running too hot?

1) Set up a regular schedule for checking the oil temperature, appearance, smell and feel. Change oil as recommended by the equipment manufacturer.
2) Be prompt about removing, checking and repairing or replacing valves, pumps or other components that are running hot.
3) If relief or flow-control valves are running hot, check and adjust their settings. Follow your equipment owner's manual.
4) Break in new components gradually. New, close fitting parts expand at different rates, and are especially prone to seize when they get too hot.
5) Start a cold pump motor on hot oil by jogging just enough to draw the hot oil into the component. Then wait a few minutes to allow the temperature to equalize in all the pump's parts. Repeat until the temperature on the outside of the pump is the same as that on the piping.
6) Keep your equipment clean. A thick layer of dirt acts as insulation. It will prevent the hydraulic system from getting rid of heat.
7) On hot days, and in hot climates, check and change the oil more frequently. Be sure to use an oil recommended for hot weather operation by the equipment manufacturer or oil supplier.

Measuring Oil Temperature

There are several ways to check the temperature of the oil. The best, most accurate method is by means of a thermometer. On some machines, this is mounted on the reservoir. Make it a habit to check the thermometer periodically, after the equipment has been running for more than an hour.

If your machine doesn't have a reservoir thermometer, use the "palm test". First check the tank with your fingertip; if it's not too hot to touch, place your palm on the tank. You'll be able to hold it there without discomfort if the oil temperature is about 130°F or below.

Maintenance Suggestions (Cont.)

Isolating Trouble-Spots

To determine which components are "running hot" and overheating the oil, feel the outlet fittings and lines at the valves, pumps and motors. If the oil temperature is normal going into a component but hot coming out, that could be one of the potential problem areas.

A sticking valve can cause excessive heat. If a spool does not return promptly to the neutral position, the pump flow will be dumping continuously. This builds up heat rapidly.

If a relief valve is set too low, part of the oil will be dumped across the valve with every cycle. This too, generates excessive heat. Even when all valves are set properly, they may not be operating well because of worn orifices or seals.

Always remove and check the hot components first.

Check Oil Samples Periodically

Checking oil temperature periodically is good preventive maintenance. So too is the practice of periodically siphoning an oil sample from the reservoir, and comparing it with a sample of clean, new oil.

Oil that has been running too hot will look darker and feel thinner than new oil. It will also smell burned. Normally it will contain more contaminants, because hot oil leads to accelerated wear of component parts.

Troubleshooting

Troubleshooting Areas

Dirty Oil

1) Components not properly cleaned after servicing.
2) Inadequate screening in fill pipe.
3) Air breather left off. (No air breather provided or insufficient protection of air breather).
4) Tank not properly sealed.
5) Pipe lines not properly covered while servicing machine.
6) Improper tank baffles not providing settling basin for heavy materials.
7) Filter dirty or ruptured.

Fire resistant fluids

1) Incorrect seals cause binding spools.

2) Paint, varnish or enamel in contact with fluids can cause sludge deposits on filters and around seal areas.

3) Electrolytic action is possible with some metals. Usually zinc or cadmium.

4) Improve mixtures can cause heavy sludge formations.

5) High temperatures adversely affect some of the fluids, particularly the water base fluids.

6) Adequate identification of tanks containing these fluids should be provided so that they will be refilled with the proper media.

7) As with mineral base oils, nuisance leaks should be remedied at once.

8) Make certain replacement parts are compatible with fluid media.

Foaming Oil

1) Tank line not returned below fluid level.

2) Broken pipe.

3) Line left out between a bulkhead coupling and the bottom of the tank after cleaning.

4) Inadequate baffles in reservoir.

5) Fluid contaminated with incompatible foreign matter.

6) Suction leak to pump aerating oil.

7) Lack of anti-foaming additives.

Moisture in Oils

1) Cooling coils not below fluid levels.
2) Cold water lines fastened directly against hot tank causing condensation within the tank.
3) Soluble oil solution splashing into poorly sealed tanks or fill pipes left open.
4) Moisture in cans used to replace fluid in tanks.
5) Extreme temperature differential in certain geographical locations.
6) Drain not provided at lowest point in tank to remove water collected over possibly long operating periods.

Overheating of System

1)Relief valve set too close to compensator pressure setting.
2)Water shut off or heat exchanger clogged.

Troubleshooting (Cont.)

3) Continuous operation at relief setting.
   a. Stalling under load, etc.
   b. Fluid viscosity too high or too low.

4) Excessive slippage or internal leakage.
   a. Check stall leakage part pump, motors and cylinders.
   b. Fluid viscosity too low.

5) Reservoir sized too small.

6) Case drain line from pressure compensated pump returning oil too close to suction line.
   a. Re-pipe case drain line to opposite side of reservoir baffling.

7) Pipe, tube or hose I.D. too small causing high velocity.

8) Valving too small, causing high velocity.

9) Improper air circulation around reservoir.

10) System relief valve set too high.

11) Power unit operating in direct sunlight or ambient temperature is too high.

Foreign matter sources in circuit

1) Pipe scale not properly removed.
2) Sealing compound (pipe dope, Teflon tape) allowed to get inside fittings.
3) Improperly screened fill pipes and air breathers.
4) Burrs inside piping.
5) Tag ends of packing coming loose.
6) Seal extrusions from pressure higher than compatible with the seal or gasket.
7) Human element... not protecting components while being repaired and open lines left unprotected.
8) Wipers or boots not provided on cylinders or rams where necessary.
9) Repair parts and replacement components not properly protected while stored in repair depot. (Rust and other contaminants).

Troubleshooting Pumps

Pump makes excessive noise

1) Check for vacuum leaks in the suction line. (Such as leak in fitting or damaged suction line.)

2) Check for vacuum leaks in the pump shaft seal if the pump is internally drained. Flooding connections with the fluid being pumped may cause the noise to stop or abate momentarily. This will locate the point of air entry.

3) Check alignment with drive mechanism. Misalignment will cause premature wear and subsequent high noise level in the operation.

4) Check manufacturer's specifications relative to wear possibilities and identification of indications of wear as high operating noise level, etc.

5) Check compatibility of fluid being pumped against manufacturer's recommendations.

6) Relief or unloading valve set too high. Use reliable gauge to check operating pressure. Relief valve may have been set too high with a damaged pressure gauge. Check various unloading devised to see that they are properly controlling the pump delivery.

7) Aeration of fluid in reservoir (return lines above fluid level).

8) Worn or sticking vanes (vane type pump).

9) Worn cam ring (van type pump).

10) Worn or damaged gears and housing (gear pump).

11) Worn or faulty bearing.

12) Reversed rotation

13) Cartridge installed backwards or improperly.

14) Plugged or restricted suction line or suction strainer.

15) Plugged reservoir filler breather.

16) Oil viscosity too high or operating temperature too low.

17) Air leak in suction line or fittings may cause irregular movement of hydraulic system.

18) Loose or worn pump parts.

19) Pump being driven in excess of rated speed.

20) Air leak at pump shaft seal.

21) Oil level to low and drawing air in through inlet.

22) Air bubbles in intake oil.

23) Suction filter too small or too dirty.

24) Suction line too small or too long.

25) Pump housing bolts loose or not properly torqued.

Troubleshooting Pumps (Cont.)

Pump failure to delivery fluid

1) Low fluid level in reservoir.
2) Oil intake pipe suction strainer plugged.
3) Air leak in suction line and preventing priming.
4) Pump shaft turning too slowly.
5) Oil viscosity too high.
6) Oil lift too high.
7) Wrong shaft rotation.
8) Pump shaft or parts broken.
9) Dirt in pump.
10) Variable delivery pumps (improper stroke).

Oil leakage around pump

1) Shaft seal worn.

2) Head of oil on suction pipe connection – connection leaking

3) Pump housing bolts loose or improperly torqued.

4) Case drain line too small or restricted (shaft seal leaking).

Excessive pump wear

1) Abrasive dirt in the hydraulic oil being circulated through the system.

2) Oil viscosity too low.

3) System pressure exceeds pump rating.

4) Pump misalignment or belt drive too tight.

5) Air being drawn in through inlet of pump.

Pump parts inside housing broken

1) Seizure due to lack of oil.

2) Excessive system pressure above maximum pump rating.

3) Excessive torquing of housing bolts.

4) Solid matter being drawn in from reservoir and wedged in pump.

Troubleshooting Solenoid Valves

Solenoid failures

1) Voltage too low. If voltage is not sufficient to complete the stroke of the solenoid, it will burn out the coil.

2) Voltage too high. Excessive voltage can also burn out coils.

3) Signal to both solenoids of a double solenoid valve simultaneously. One or both of the solenoids will be unable to complete their stroke and will burn out. (Make certain the electrical signal is interlocked so that this condition cannot exist).

4) Mechanical damage to leads. (Short circuit, open connections, etc.)

5) Tight spool or other mechanical parts of the valve being actuated can prevent the solenoid from completing its stroke and subsequently burning out.

6) Replacement springs too heavy in valve. Overloads solenoid and shortens life.

7) Dirty contacts may not supply sufficient current to solenoid to satisfy inrush demands.

8) Low voltage direct current solenoids may be affected by low battery capacity on cold mornings directly after starting cold engine. (DC)

9) Long feed lines to low voltage solenoids may cause sufficient voltage drop to cause erratic operation.

Solenoid valve fails to operate

1) Is there an electrical signal to the solenoid or operating device? Is the voltage too low? (Check with voltmeter...test light in emergency.)

2) If the supply to the pilot body is orificed, is the orifice restricted? (Remove orifice and check for foreign matter. Flushing is sometimes necessary because of floating impediment.)

3) Has foreign matter jammed the main spool? (Remove end caps and see that main spool is free in its movement...remember that there will be a quantity of fluid escaping when the cap is removed and provide a container to catch it.)

4) Is pilot pressure available? Is the pilot pressure adequate? (Check with gauge on main pressure input port for internally piloted types and in the supply line to the externally piloted type.)

5) Is pilot drain restricted? (Remove pilot drain and let the fluid pour into an open container while the machine is again tried for normal operation. Small lines are often crushed by machine parts banging against them causing a subsequent restriction to fluid flow.)

Troubleshooting Solenoid Valves (Cont.)

6) Is pilot tank port connected to main tank port where pressures are high enough to neutralize pilot input pressure? (Combine pilot drain and pilot tank port and check for operation with the combined flow draining into an open container...block line to main tank from pilot valve...if this corrects the situation, reroute pilot drain and tank line.)

7) Are solenoids improperly interlocked so that a signal is provided to both units simultaneously? (Put test light on each solenoid lead in parallel and watch for simultaneous lighting...check electrical interlock. This condition probably burns out more solenoids than any other factor.)

8) Has mounting pad been warped from external heating? (Loosen mounting bolts slightly and see if valve functions. End caps can also be removed and check for tight spool.)

9) Is fluid excessively hot? (Check for localized heating which may indicate an internal leak...check reservoir temperature and see if it is within machine specifications.)

10) Is there foreign matter in the fluid media causing gummy deposits? (Check for contamination...make certain seals and plumbing are compatible with the type of fluid being used.)

11) Is an adequate supply of fluid being delivered to actuate the load? (Many times there is sufficient pressure to shift the valve but not enough to actuate the work load. Check pump supply pressure and volume if necessary...physical measurement of flow through relief valve with units blocked may be necessary.)

12) Check circuit for possible interlocks on pressure sources to valve or to pilot.

LEESON

ELECTRIC MOTORS
GEARMOTORS AND DRIVES

Motor Trouble-Shooting Chart

Caution:
1. Disconnect power to the motor before performing service or maintenance.
2. Discharge all capacitors before servicing motor.
3. Always keep hands and clothing away from moving parts
4. Be sure required safety guards are in place before starting equipment.

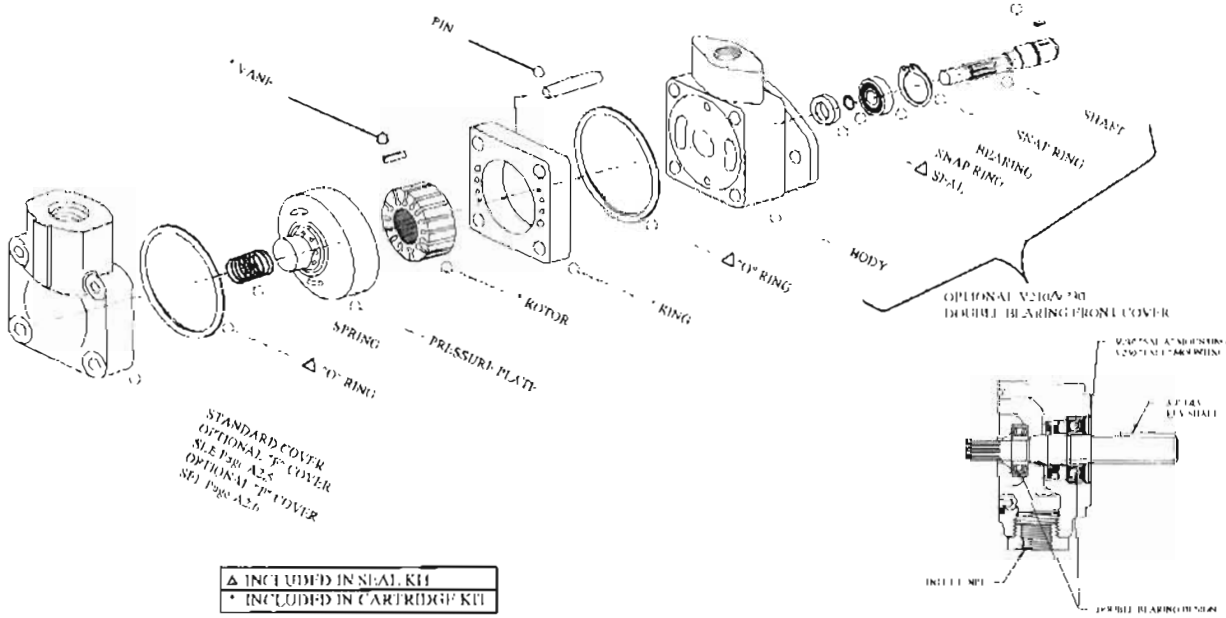
Problem:	Like Causes:	What To Do:
Motor fails to start upon initial installation.	Motor is miswired.	Verify motor is wired correctly
	Motor damaged and rotor is striking stator	May be able to reassemble; otherwise, motor should be replaced.
	Fan guard bent and contacting fan.	Replace fan guard.
Motor has been running, then fails to start	Fuse or circuit breaker tripped.	Replace fuse or reset the breaker
	Stator is shorted or went to ground. Motor will make a humming noise and the circuit breaker or fuse will trip.	Disassemble motor and inspect windings and internal connections. A blown stator will show a burn mark. Motor must be replaced or the stator rewound
	Motor overloaded or load jammed.	Inspect to see that the load is free. Verify amp draw of motor versus nameplate rating.
	Capacitor (on single phase motor) may have failed.	First discharge capacitor. To check capacitor, set volt-ohm meter to RX100 scale and touch its probes to capacitor terminals. If capacitor is OK, needle will jump to zero ohms, and drift back to high. Steady zero ohms indicates a short circuit; steady high ohms indicates an open circuit
	Starting switch has failed.	Disassemble motor and inspect both the centrifugal and stationary switches. The weights of the centrifugal switch should move in and out freely. Make sure that the switch is not loose on the shaft. Inspect contacts and connections on the stationary switch. Replace switch if the contacts are burned or pitted.
Motor runs but dies down.	Voltage drop.	If voltage is less than 10% of the motor's rating contact power company or check if some other equipment is taking power away from the motor.
	Load increased.	Verify the load has not changed. Verify equipment hasn't got tighter. If fan application verify the air flow hasn't changed.
Motor takes too long to accelerate.	Defective capacitor	Test capacitor per previous instructions
	Faulty stationary switch.	Inspect switch contacts and connections. Verify that switch reeds have some spring in them.
	Bad bearings.	Noisy or rough feeling bearings should be replaced
	Voltage too low	Make sure that the voltage is within 10% of the motor's name-plate rating. If not, contact power company or check if some other equipment is taking power away from the motor.
Motor runs in the wrong direction.	Incorrect wiring.	Rewire motor according to wiring schematic provided.
Motor overload protector continually trips.	Load too high	Verify that the load is not jammed. If motor is a replacement, verify that the rating is the same as the old motor. If previous motor was a special design, a stock motor may not be able to duplicate the performance. Remove the load from the motor and inspect the amp draw of the motor unloaded. It should be less than the full load rating stamped on the nameplate.
	Ambient temperature too high.	Verify that the motor is getting enough air for proper cooling. Most motors are designed to run in an ambient temperature of less than 40°C. (Note: A properly operating motor may be hot to the touch.)
	Protector may be defective.	Replace the motor's protector with a new one of the same rating.
	Winding shorted or grounded.	Inspect stator for defects, or loose or cut wires that may cause it to go to ground.

Motor Trouble-Shooting Chart

Problem:	Like Causes:	What To Do:
Motor vibrates.	Motor misaligned to load	Realign load.
	Load out of balance. (Direct drive application.)	Remove motor from load and inspect motor by itself. Verify that motor shaft is not bent. Rule of thumb is .001" runout per every inch of shaft length.
	Motor bearings defective	Test motor by itself. If bearings are bad, you will hear noise or feel roughness. Replace bearings. Add oil if a sleeve of bearing. Add grease if bearings have grease fittings.
	Rotor out of balance.	Inspect motor by itself with no load attached. If it feels rough and vibrates but the bearings are good, it may be that the rotor was improperly balanced at the factory. Rotor must be replaced or rebalanced.
	Motor may have too much endplay.	With the motor disconnected from power turned shaft. It should move but with some resistance. If the shaft moves in and out too freely, this may indicate a preload problem and the bearings may need additional shimming.
	Winding may be defective.	Test winding for shorted or open circuits. The amps may also be high. Replace motor or have stator rewound.
Bearings continuously fail.	Load to motor may be excessive or unbalanced.	Besides checking load, also inspect drive belt tension to ensure it's not too tight may be too high. An unbalanced load will also cause the bearings to fail.
	High ambient temperature.	If the motor is used in a high ambient, a different type of bearing grease may be required. You may need to consult the factory or a bearing distributor.
The motor, at start up, makes a loud rubbing or grinding noise.	Rotor may be striking stator.	Ensure that motor was not damaged in shipment. Frame damage may not be repairable. If you cannot see physical damage, inspect the motor's rotor and stator for strike marks. If signs of rubbing are present, the motor should be replaced. Sometimes simply disassembling and reassembling motor eliminates rubbing. Endbells are also sometimes knocked out of alignment during transportation.
Start capacitors continuously fail.	The motor is not coming up to speed quickly enough	Motor may not be sized properly. Verify how long the motor takes to come up to speed. Most single phase capacitor start motors should come up to speed within three seconds. Otherwise the capacitors may fail.
	The motor is being cycled too frequently.	Verify duty cycle. Capacitor manufacturers recommend no more than 20, three-second starts per hour. Install capacitor with higher voltage rating, or add bleed resistor to the capacitor.
	Voltage to motor is too low.	Verify that voltage to the motor is within 10% of the nameplate value. If the motor is rated 208-230V, the deviation must be calculated from 230V.
	Starting switch may be defective, preventing the motor from coming out of start winding.	Replace switch.
Run capacitor fail.	Ambient temperature too high.	Verify that ambient does not exceed motor's nameplate value.
	Possible power surge to motor, caused by lightning strike or other high transient voltage.	If a common problem, install surge protector.

LEESON ELECTRIC CORPORATION
BOX 241 GRAFTON, WISCONSIN 53024-0241 U.S.A.

IFP V10/V20/V210/V230 VANE PUMP SERVICE PARTS INFORMATION



PUMP SE	C. KIT	ROTOR	VANES	RING	SEAL	SEAL KIT	BEARING	PR. PL.	SPRING	BODY	COVER	SHAFT NO
V10...1	923471N	317681N	923499N	317674N	263585N	923548N	148423N	374343N	345262N	352699N	372863N	SHAFT 1 NO.374338N
.2	923470N			317675N	VITON	VITON						SHAFT 3 NO.374340N
...3	923496N			317676N	388205N	919772N						SHAFT 4 NO.378959N
...4	923469N	351247N	923500N	317677N								SHAFT 6 NO.382250N
.5	923468N			317678N								SHAFT 11 NO.374339N
...6	923497N	357268N	923501N	355641N								SHAFT 12 NO. 375480N
...7	923498N			331813N								SHAFT 38 NO. 387481N
V20...5	924076N	358328N	923485N	388284N	229235N	922733N	098574N	359287N	28422N	V20	313657N	V20
(V210)...6	923480N			328150N	VITON	VITON				280689N		SHAFT 1 NO.280372N
(V230)...7	923481N	358330N	923493N	328152N	279499N	919805N				V210		SHAFT 3 NO.280504N
...8	923483N			331791N						280210N		SHAFT 6 NO.297330N
...9	923484N			331789N						V230		SHAFT 11 NO.280515N
...10	923620N	358332N	923478N	374309N						280230N		SHAFT 15 NO.294922N
...11	923482N			328156N								SHAFT 38 NO.328096N
...12	923486N	358334N	923479N	331806N								V210/V230
.. 13	923487N			331807N								SHAFT 1 NO.280210N

- All cartridge assemblies are factory tested prior to shipping -

Rear Cover Bolt Torque

V10	40 FT/LBS
V20	80 FT/LBS

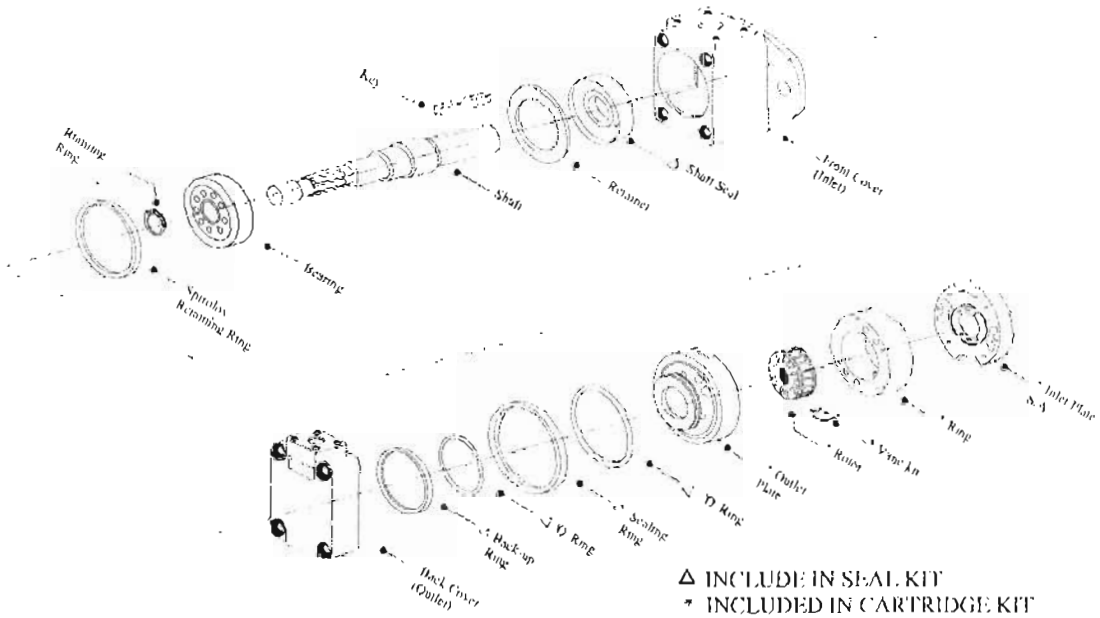
Changing Cartridge Rotation

Assemble the ring using the locating pins for alignment making sure the arrow on the perimeter point's in the proper direction of rotation. Install the rotor on shaft and insert vanes in the rotor slots. Be certain the radius edges of the vanes are towards the cam ring.

FLOW CONTROL/PRIORITY COVER AVAILABLE

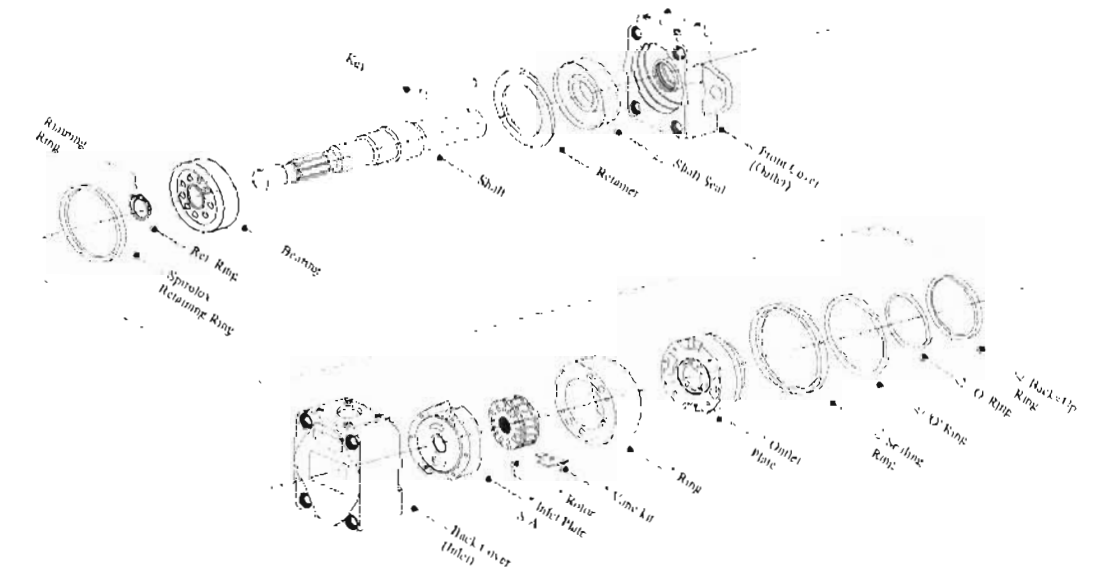
IFP INDUSTRIAL SINGLE VANE PUMP SERVICE PARTS INFORMATION

INTERNATIONAL



20V

△ INCLUDE IN SEAL KIT
* INCLUDED IN CARTRIDGE KIT



25V/35V/45V

△ INCLUDE IN SEAL KIT
* INCLUDED IN CARTRIDGE KIT

IFP INDUSTRIAL SINGLE VANE PUMP SERVICE PARTS INFORMATION

CARTRIDGE CHART

PUMP SE	CARTRIDGE KITS		ROTOR	VANE KIT	RING	INLET PLATE	OUTLET PLATE	SHAFTS	
20V	5	02-102518N	402690N	02-136720N	333624N	584383N	585382N	1	497109N
	8	02-102519N			333625N			551	497113N
	11	02-102520N	403539N	02-136721N	333626N	584384N			
	12	02-102521N			353901N				
	14	02-102522N			353902N				
25V	12	02-102532N	584618N	941214N	326984N	591016N	588690N	1	238755N
	14	02-102533N			326985N			11	238929N
	17	02-102534N			326986N			86	419882N
	21	02-102535N			326988N				
35V	21	02-102551N	575478N	941019N	394961N	576265N	575479N	1	233624N
	25	02-102552N			319396N			11	242287N
	30	02-102553N			319397N			86	392669N
	35	02-102554N			319398N				
	28	02-102555N			319399N				
45V	42	02-102572N	578900N	941049N	297510N	578903N	580921N	1	233369N
	50	02-102574N			297502N			11	242885N
	60	02-102575N			297503N			86	361760N

- All Cartridge assemblies are factory tested before shipping -

PUMP SE	BUNA SEAL KIT	VITON SEAL KIT	BUNA SHAFT SEAL	VITON SHAFT SEAL	SECONDARY SHAFT SEAL	BEARING	FRONT COVER	BACK COVER
20V	497128N	981322N	394976N	429286N	429283N	1704N	02-102335N	250824N
25V	922850N	919656N	394976N	429286N	429283N	1705N	942353N	234309N
35V	922851N	919262N	394973N	429284N	429281N	3844IN	942355N	234248N
45V	919850N	919632N	394974N	429285N	429282N	1318I2N	942356N	229633N

BOLT TORQUES

PUMP SE	COVER BOLT (FT. LB.)	CARTRIDGE KIT (IN. LB.)
20V	50	30
25V	50	40
35V	100	90
45V	100	100

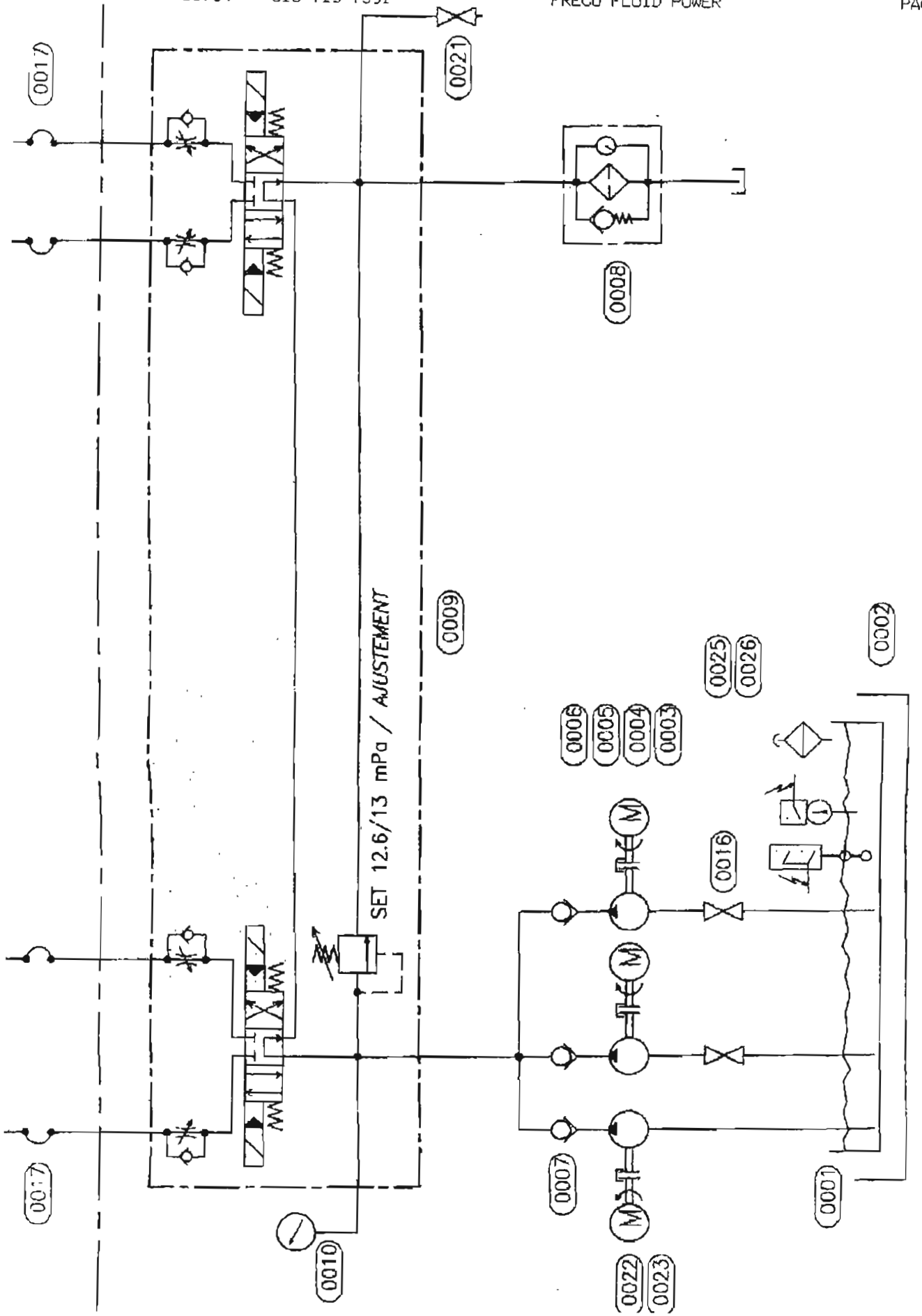
Cartridge Kit Rotation

To change Cartridge Kit rotation, reverse the location of the inlet and the outlet support plates. Hand tighten the cartridge screws and use pump cover to align all the parts. Remove the cover and tighten the cartridge screws to the designated value. Sharp edge of vanes must lead in direction of rotation.

Filtration

For satisfactory service life, use full flow filtration to provide fluid which meets ISO cleanliness code 16/13 or better.

0001	1	RESERVOIR, 180 litres capacity, to provide 35 cm
		fluid head to pump, spin-on air filter element, visual oil
		level/ temperature indicator
0002	1	SPILL CONTAINMENT TRAY, 110% of reservoir fill,outline 812 x 1220
0003	2	PUMP VANE TYPE, 26 l/ min. rated 28 MPa
0004	2	COUPLING, jaw type with elastomeric insert
0005	2	ADAPTER HOUSING
0006	2	MOTOR, 7.5 kW 1725 rpm 550 volt 3 ph 215TC frame
0007	3	CHECK VALVE, 21 mPa, O RING flange mounted
0008	1	FILTER, return line,10 MICRON,spin-on element,1.50-16 UNF thread
		200 litres nominal flow capacity, by-pass spring 175 kPa
		visual condition indicator, SAE J514 ports.
0009	1	DIRECTIONAL CONTROL VALVE ASSEMBLY, manifold mounted
		modular relief, solenoid operated 120 vac, SAE J514 ports
		adj. pilot choke, modular adjustable flow controls.
0010	1	PRESSURE GAUGE, 90 mm dia. 0-21 mPa
0011	2	DECELERATION VALVE, 19 mm diameter SAE J514 PORTS
0012	2	COUNTERBALANCE VALVE, 75 lpm SAE J514 ports
0013	0	HYDRAULIC CYLINDER, mill type 8.00 bore 4.00 rod
		54 stroke 8 stop tube, 3-12 UN3A thread
0014	2	LOCK VALVE, pilot to open SAE J514 PORTS
0015	0	HYDRAULIC CYLINDER, mill type, 5 in. bore , 2 in rod
		30 in stroke, 3 in. stop tube, 1.75-12 UN3A thread.
0016	2	SHUT-OFF VALVE
0017	4	HOSE, SAE 100R12, 19 mm dia., spiral wrap, SAE J1453 ORS crimp
		fittings, proof tested, fire sleeved, and ends capped for
		shipping
0018	6	HOSE, SAE 100R12, 19 mm dia., spiral wrap, SAE J1453 ORS crimp
		fittings proof tested , and ends capped for shipping
0019	4	HOSE, SAE 100R12, 12.5 mm dia., spiral wrap, SAE J1453 ORS crimp
		fittings, proof tested, and ends capped for shipping
0020	300	TUBING, 25 mm diameter 316 stainless steel .109 inch wall
		(2.8 mm)
0021	1	SAMPLING VALVE,
0022	1	MOTOR, 1.5 kW 1750 rpm 184C frame 120/240 volt 1 ph
0023	1	PUMP, w/drive and tank mounting flange.
0024	20	TUBING, 12.5 mm diameter 316 stainless steel .058 inch
		wall (1.4 mm)
0025	1	FLOAT SWITCH, 2 level, set low level and emergency shut-off
0026	1	THERMAL SWICH, set for 70°C activation


0017
0021
0008
0009
SET 12.6/13 mPa / AJUSTEMENT
0025
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0002
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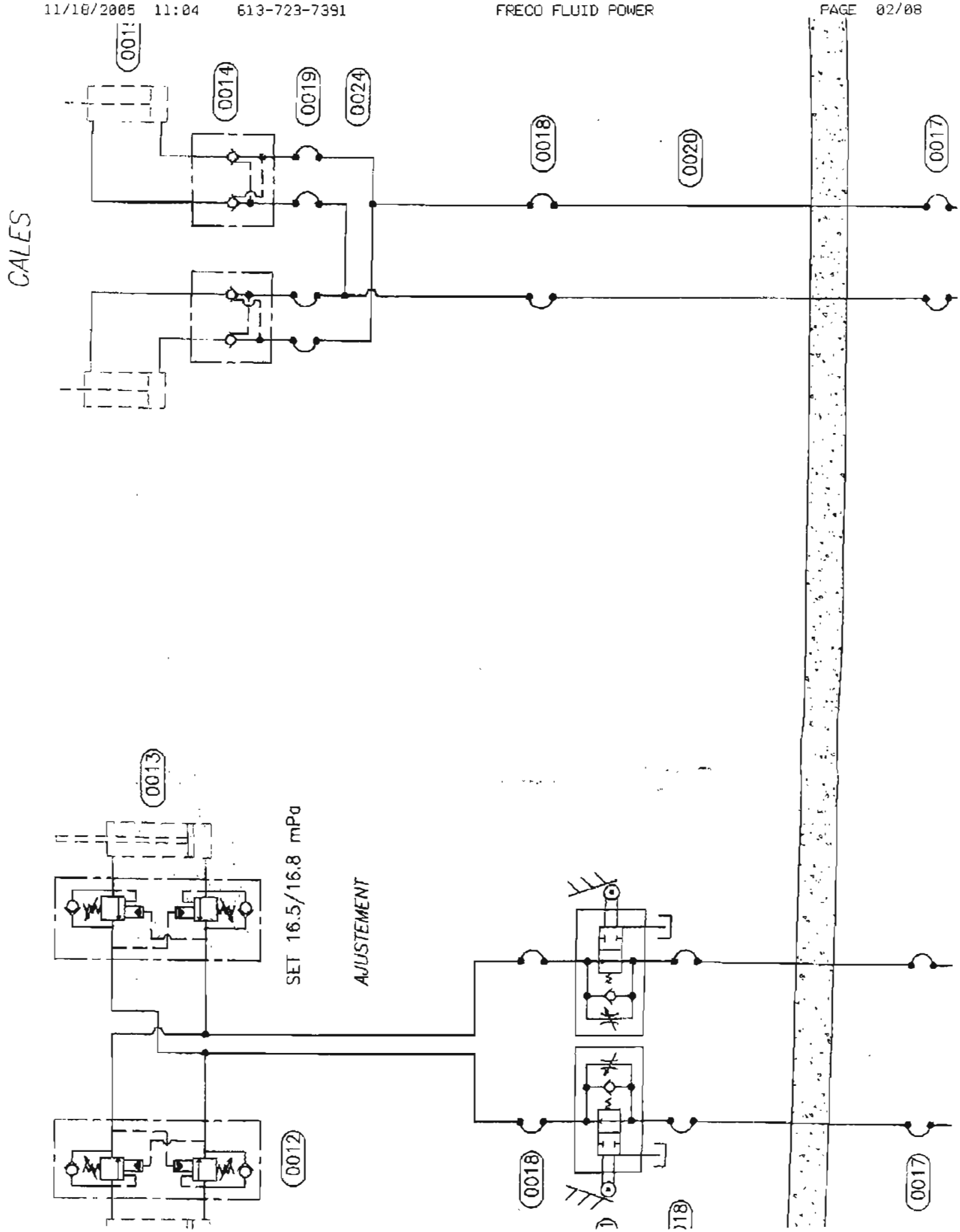
0023


CALES
0014
0019
0024
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0020
0017
0013
SET 16.5/16.8 mPa
AJUSTEMENT
0012
0018
0017

871P VersaCube™ 2-Wire AC/DC

871P AC/DC General Purpose Micro Quick-Disconnect Style page 2–113

871P AC/DC WFI Mini Quick-Disconnect Style page 2–113

871P AC/DC WFI Micro Quick-Disconnect Style page 2–113

Specifications

	General Purpose	Weld Field Immune
Load Current	2–100mA	2–300mA
Inrush Current (1 cycle)	≤ 2A	≤ 2A
Leakage Current	≤1.5mA@20V ≤1.7mA@120V ≤2.0mA@250V	≤1.5mA@20V ≤1.7mA@120V ≤2.0mA@250V
Operating Voltage	20–250V AC/DC	20–250V AC/DC
Voltage Drop	<10V	<10V
Repeatability	≤10% of effective operating distance	≤10% of effective operating distance
Hysteresis	12% typical	12% typical
False Pulse Protection	Incorporated	Incorporated
Transient Noise Protection	Incorporated	Incorporated
Short Circuit Protection	Incorporated	Incorporated
Overload Protection	Incorporated	Incorporated
Weld-Field Immunity	N/A	1000 Gauss ❶
Approvals	UL listed, c–UL certified, and CE marked for all applicable directives	
Enclosure	NEMA 1, 2, 3, 4, 6, 6P, 12, 13; IP67 (IEC 529), 1200 psi (8270kPa) washdown; Plastic body, zinc base	
Connections	Quick-Disconnect: 3-pin mini style 3-pin micro style	
LED	Red: Output Energized Green: Power (short circuit if flashing)	
Operating Temperature	–25°C to +70°C (–13°F to +158°F)	
Shock	30g, 11ms	
Vibration	55Hz, 1mm amplitude, 3 planes	

❶ Measured with field perpendicular to sensing face.

Correction Factors

Target Material	Correction Factor
Steel	1.0
Stainless Steel	0.7–0.8
Brass	0.4–0.5
Aluminum	0.3–0.4
Copper	0.2–0.3

Features

- New rugged housing
- Burn and weld-slag resistant body on weld field immune models
- Convenient mounting base
- 2-wire operation
- 3-pin connection
- 20–250V AC/DC
- Normally open or normally closed output
- Weld-field immune models
- Short circuit, overload, false pulse, and transient noise protection
- UL listed, c–UL certified, and CE marked for all applicable directives

Product Selection

Head Size	Weld Field Immune	Nominal Sensing Distance mm (inches)	Shielded	Output Configuration	Switching Frequency (Hz)	Catalog Number	
						Mini QD Style	Micro QD Style
40mm	N	20 (0.79)	Y	N.O.	30	871P–B20N40–N3	871P–B20N40–R3
				N.C.		871P–B20C40–N3	871P–B20C40–R3
		40 (1.57)	N	N.O.	20	871P–B40N40–N3 ❶	871P–B40N40–R3 ❶
				N.C.		871P–B40C40–N3 ❶	871P–B40C40–R3 ❶
	Y	15 (0.59)	Y	N.O.	30	871P–BW15N40–N3	871P–BW15N40–R3
				N.C.		871P–BW15C40–N3	871P–BW15C40–R3
		25 (0.98)	N	N.O.	20	871P–BW25N40–N3	871P–BW25N40–R3
				N.C.		871P–BW25C40–N3	871P–BW25C40–R3
Recommended Standard QD Cordset (–6F = 1.8m (6ft), –2 = 2m (6.5ft))						889N–F3AFC–6F	889R–F3ACA–2

❶ Assured operating distance for general purpose unshielded models is 0 to 33mm.

QD Cordsets and Accessories

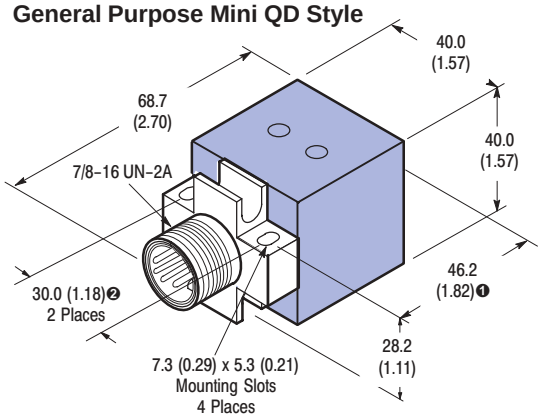
Description	Page Number
Other Cordsets Available	7–8, 7–68
Terminal Chambers	7–20
Mounting Kit ❷	2–192
Limit Switch Style Mounting Brackets	2–193
PTFE Covers	2–194

❷ Each Weld Field Immune unit is supplied with mounting hardware, a ground lug, a ground screw, and an optional adaptor for competitive retrofits. Additional sets of hardware are available under catalog number 871A–PKIT.

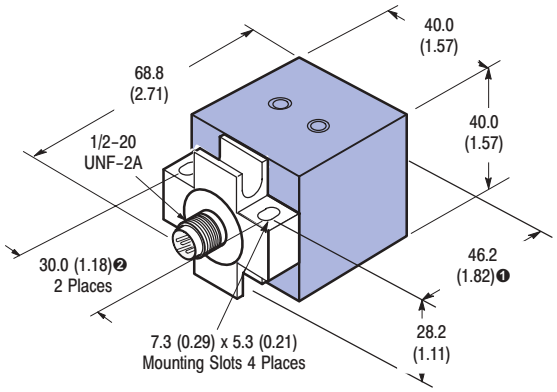
871P VersaCube™ 2-Wire AC/DC

Dimensions—mm (inches)

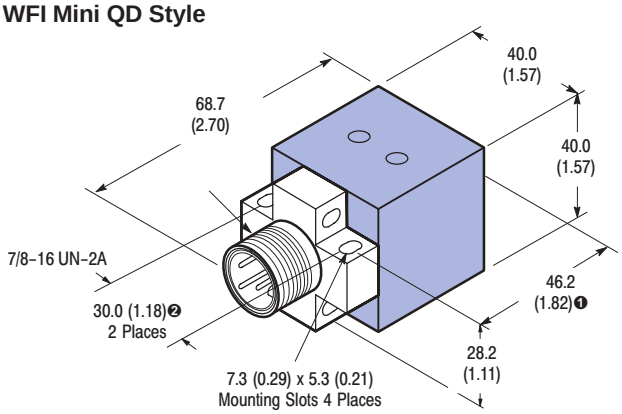
General Purpose Mini QD Style



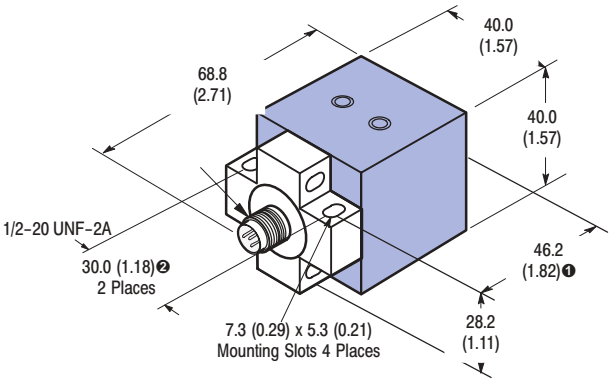
General Purpose Micro QD Style



WFI Mini QD Style



WFI Micro QD Style

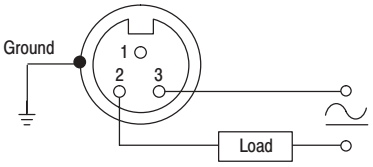


❶ With retrofit adaptor, distance from face to mounting holes becomes 60.0 (2.36).
❷ With retrofit adaptor, spacing between mounting holes becomes 20.0 (0.79).

Wiring Diagrams

Mini QD Style

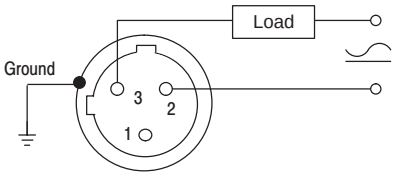
Normally Open or Normally Closed



Note: Load can be switched to pin 3.

Micro QD Style

Normally Open or Normally Closed



Note: Load can be switched to pin 2.

Note: Unit must be mounted to a grounded metal frame or grounded via field wiring lug per NEC requirements. Recommended grounding lug is available in Allen-Bradley mounting kit **871A–PKIT**. This kit is included with all weld field immune models.

FRECO
FLUID
POWER

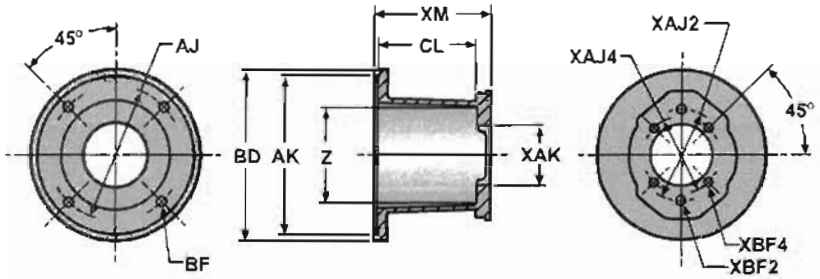
77 Auriga Drive, Unit 9
Nepean, Ont. K2E 7Z7
Tel : (613) 226-1201
Fax : (613) 723-7391

Pump and Electric Motor Information.

Parker Hydraulics

Horizontal Mount Selection Method

1. Check TABLES 2 thru 5 to determine pump flange size.
2. Measure the pump shaft length from the shaft end to the flange mounting face and ADD to the motor shaft length shown in TABLE 6. An additional 1/16 inch (minimum) is recommended for shaft end clearance.
3. Refer to the appropriate TABLE (7 thru 11) according to the NEMA motor frame size and locate the applicable pump flange selection from STEP 1, above.
4. Select the mount length option (dimension 'XM' or 'M' in tables) based on the minimum length determined in STEP 2, above.
5. Check for proper clearance between the mount inner surfaces and the coupling O.D. (dimension 'Z' and 'CL' in tables). Dimensional data for Magnaloy Couplings is shown in TABLE 1 for reference. A complete Magnaloy Coupling catalog is available upon request.



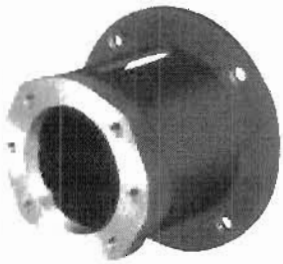


TABLE 7 - NEMA Frames 56C, 143TC/145TC, 182UC/184UC

Horizontal Mounting (or Vertical Mounting - Option A)

MOTOR END DATA — AJ 5.88 | BF 7/16 | BD 6.81 | AK 4.501

RADIAL CLEARANCE "Z" = 4.15

PUMP FLANGE		PUMP END DATA XAK	XAJ2	XBF2	XAJ4	XBF4	3.50 LENGTH MOUNT NO.	CL	XM	4.25 LENGTH MOUNT NO.	CL	XM	4.50 LENGTH MOUNT NO.	CL	XM
USA4F17	4 Bolt	1.782			2.84	5/16-18	M056354F	2.81	3.50	M056424F	3.56	4.25	M056454F	3.81	4.50
SAE AA	2 Bolt	2.001	3.25	3/8-16			M056352AA	2.81	3.50	M056422AA	3.56	4.25	M056452AA	3.81	4.50
SAE A	2(4) Bolt	3.251	4.19	3/8-16	4.12	3/8-16	M056352A	2.81	3.50	M056422A	3.56	4.25	M056452A	3.81	4.50
80 A2/B4	2(4) Bolt	80.01mm	109mm	3/8-16	103mm	5/16-18	M0563580M	2.81	3.50	M0564280M	3.56	4.25	M0564580M	3.81	4.50
80 S4	4 Bolt	80.01mm			100mm	5/16-18	M0563580MS	2.81	3.50	M0564280MS	3.56	4.25	M0564580MS	3.81	4.50

MOTOR END DATA — AJ 5.88 | BF 7/16 | BD 6.81 | AK 4.501

RADIAL CLEARANCE "Z" = 4.15

*RADIAL CLEARANCE "Z" = 4.10

PUMP FLANGE		PUMP END DATA XAK	XAJ2	XBF2	XAJ4	XBF4	5.00 LENGTH MOUNT NO.	CL	XM	5.25 LENGTH MOUNT NO.	CL	XM
USA4F17	4 Bolt	1.782			2.84	5/16-18	M056504F	4.31	5.00	M056524F	4.56	5.25
SAE AA	2 Bolt	2.001	3.25	3/8-16			M056502AA	4.31	5.00	M056522AA	4.56	5.25
SAE A	2(4) Bolt	3.251	4.19	3/8-16	4.12	3/8-16	M056502A	4.31	5.00	M056522A	4.56	5.25
SAE B	2(4) Bolt	4.001	5.75	1/2-13	5.00	1/2-13	M056502B*	3.93	5.00	M056522B*	4.18	5.25
80 A2/B4	2(4) Bolt	80.01mm	109mm	3/8-16	103mm	5/16-18	M0565080M	4.31	5.00	M0565280M	4.56	5.25
80 S4	4 Bolt	80.01mm			100mm	5/16-18	M0565080MS	4.31	5.00	M0565280MS	4.56	5.25
100 A2/B4	2(4) Bolt	100.01mm	140mm	1/2-13	125mm	3/8-16	M05650100M*	3.93	5.00	M05652100M*	4.18	5.25

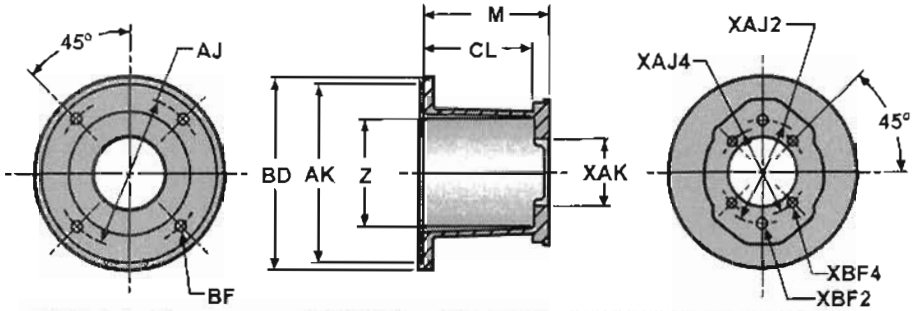


TABLE 8A - NEMA Frames 182TC - 256TC, 213UC-256UC

Horizontal Mounting (or Vertical Mounting - Option A)

MOTOR END DATA — RADIAL CLEARANCE "Z" = 5.00

182-A Casting

PUMP FLANGE		PUMP END DATA					4.75 LENGTH			5.00 LENGTH			5.25 LENGTH		
AJ / BF / BD / AK		XAK	XAJ2	XBF2	XAJ4	XBF4	MOUNT NO.	CL	M	MOUNT NO.	CL	M	MOUNT NO.	CL	M
USA4F17	4 Bolt	1.782			2.84	5/16-18	M182474F	4.00	4.75	M182504F	4.31	5.00	M182524F	4.31	5.25
SAE AA	2 Bolt	2.001	3.25	3/8-16			M182472AA	4.00	4.75	M182502AA	4.31	5.00	M182522AA	4.31	5.25
SAE A	2(4) Bolt	3.251	4.19	3/8-16	4.12	3/8-16	M182472A	4.00	4.75	M182502A	4.31	5.00	M182522A	4.31	5.25
80 A2/B4	2(4) Bolt	80.01mm	109mm	3/8-16	103mm	5/16-18	M1824780M	4.00	4.75	M1825080M	4.31	5.00	M1825280M	4.31	5.25
80 S4	4 Bolt	80.01mm			100mm	5/16-18	M1824780MS	4.00	4.75	M1825080MS	4.31	5.00	M1825280MS	4.31	5.25

MOTOR END DATA — RADIAL CLEARANCE "Z" = 5.00

PUMP FLANGE		PUMP END DATA					5.81 LENGTH			6.81 LENGTH		
AJ / BF / BD / AK		XAK	XAJ2	XBF2	XAJ4	XBF4	MOUNT NO.	CL	M	MOUNT NO.	CL	M
USA4F17	4 Bolt	1.782			2.84	5/16-18	M182584F	5.06	5.81	M182684F	6.06	6.81
SAE AA	2 Bolt	2.001	3.25	3/8-16			M182582AA	5.06	5.81	M182682AA	6.06	6.81
SAE A	2(4) Bolt	3.251	4.19	3/8-16	4.12	3/8-16	M182582A	5.06	5.81	M182682A	6.06	6.81
80 A2/B4	2(4) Bolt	80.01mm	109mm	3/8-16	103mm	5/16-18	M1825880M	5.06	5.81	M1826880M	6.06	6.81
80 S4	4 Bolt	80.01mm			100mm	5/16-18	M1825880MS	5.06	5.81	M1826880MS	6.06	6.81

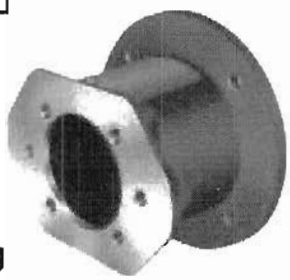


TABLE 8B - NEMA Frames 182TC - 256TC, 213UC-256UC

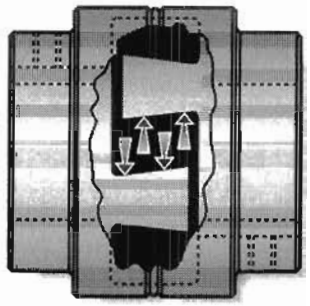
Horizontal Mounting

MOTOR END DATA — RADIAL CLEARANCE "Z" = 5.00

182-B Casting

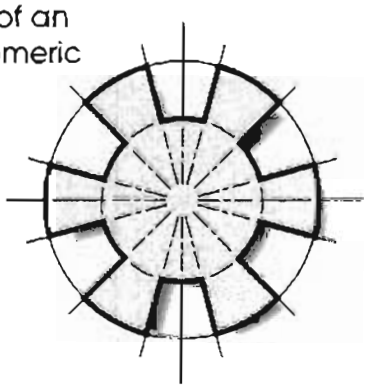
PUMP FLANGE		PUMP END DATA					5.25 LENGTH			5.81 LENGTH			6.00 LENGTH		
AJ / BF / BD / AK		XAK	XAJ2	XBF2	XAJ4	XBF4	MOUNT NO.	CL	M	MOUNT NO.	CL	M	MOUNT NO.	CL	M
SAE B	2(4) Bolt	4.001	5.75	1/2-13	5.00	1/2-13	M182522B	4.50	5.25	M182582B	5.06	5.81	M1826028	5.25	6.00
SAE C	2(4) Bolt	5.001	7.12	5/8-11	6.38	1/2-13	M182522C	4.50	5.25	M182582C	5.06	5.81	M182602C	5.25	6.00
100 A2/B4	2(4) Bolt	100.01mm	140mm	1/2-13	125mm	3/8-16	M18252100M	4.50	5.25	M18258100M	5.06	5.81	M18260100M	5.25	6.00
125 A2/B4	2(4) Bolt	125.01mm	180mm	5/8-11	160mm	1/2-13	M18252125M	4.50	5.25	M18258125M	5.06	5.81	M18260125M	5.25	6.00

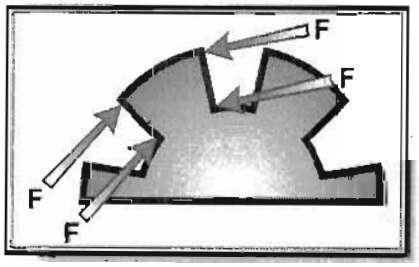
Magnaloy Coupling Design Features



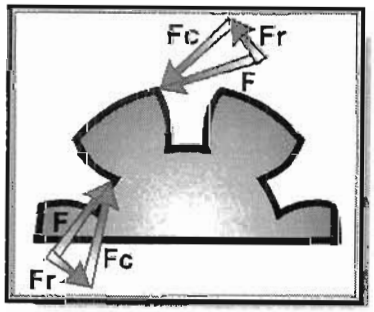
"Load-Lock" Design is simple and effective. The drive-lug configuration is tapered from top to base, as are the mating lugs of the opposing coupling hub. Under load, the insert conforms to the tapers, inter-locking the two hubs. This load-lock design protects bearings and equipment by eliminating end thrust in both directions... and it requires only one set-screw in each hub.

Radial Lug Design is logical and efficient. The most common failure of an elastomeric insert type drive coupling is hysteresis failure of the elastomeric element - breakdown of the elastomer due to cyclical overworking and associated heat generation. Magnaloy Coupling's drive lugs are in a true radial orientation. Applied forces are evenly distributed in the compressive direction only, eliminating the heat generating radial component. True compressive loading reduces internal heat generation and improves elastomer life.

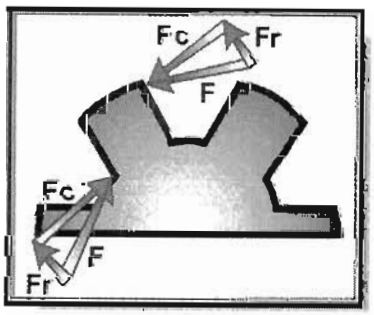




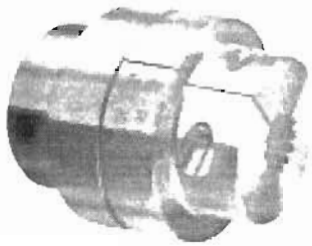
MAGNALOY COUPLING DESIGN
Under loaded conditions, the resultant forces applied on the element segments are evenly distributed in the compressive direction only. This results in no radial forces to multiply the internal heat generation.



CONVENTIONAL DESIGN A
Under loaded conditions this jaw design results in the applied forces exerting components in the compressive and radical directions. These forces change direction and magnitude along the jaw arc which greatly increase the internal movement of the element which causes heat generation.



CONVENTIONAL DESIGN B
This more conventional straight sided jaw design also exerts component forces in the compressive and radial directions when under load. The radial component is outward (acting to extrude the element) and changes in magnitude only, as does the compressive component, along the jaw surface. The component forces resulting from this design also causes increased internal movement in the element.



Magnaloy is the original lightweight, heavy-duty flexible drive coupling. Light weight magnesium construction makes Magnaloy couplings 76% lighter than cast iron and 36% lighter than aluminum units... and they're stronger than either!

The benefits are many... Reduced loads on bearings, shafts and pumps, for longer component life. Easier handling and installation. Rust proof and corrosion resistant.

Magnaloy's close machining tolerances (TIR of .002") assures vibration - free operation and easy, accurate alignment without need for special tools. Solid magnesium alloy permanent mold castings are heat treated and offer the highest strength-to-weight ratio available.

Coupling Performance Specifications

Coupling Model	Maximum Bore	Wr^2 lb.- ft^2.	Insert Number	Rated Torque lb.- in.	Torsional Rigidity lb-in/Deg	Horse Power Rating@ 100 rpm	1200 rpm	1800 rpm
100	1-1/8	0046	170N	340.7	42	.55	6.5	9.8
			170U	511.0	53	.82	9.8	14.7
			170H	1,022.1	182	1.65	19.8	29.7
200	1-3/8	0068	270N	398.3	55	.64	7.6	11.5
			270U	597.4	68	.96	11.5	17.2
			270H	1,194.9	234	1.92	23.0	34.5
300	1-5/8	022	370N	701.4	81	1.12	13.5	20.2
			370U	1,052.1	148	1.68	20.2	30.3
			370H	2,104.2	336	3.36	40.4	60.6
400	1-7/8	031	470N	1,056.3	138	1.69	20.3	30.4
			470U	1,584.5	310	2.5	30.4	45.6
			470H	3,168.9	488	5.1	60.8	91.3
500	2-3/8	071	570N	2,194.8	314	3.5	42.1	63.2
			570U	3,292.2	695	5.3	63.2	94.8
			570H	6,584.4	1,571	10.5	126.4	189.6
600	2-5/8	16	670N	4,946.7	676	7.9	94.9	142.5
			670U	7,420.1	1,510	11.9	142.5	213.7
			670H	14,840.1	2,960	23.7	284.9	427.4
700	2-7/8	34	770N	11,639.8	1,805	18.6	223.5	335.2
			770U	17,459.7	2,104	27.9	335.2	502.8
			770H	29,099.5	-	46.5	558.75	838.0
800	3-1/8	65	870N	21,889.4	3,680	35.0	420.3	630.4
			870U	32,834.1	-	52.5	630.4	945.6
			870H	47,062.2	-	75.2	903.0	1,354.5
900	3-1/4	4.20	970N	47,842.3	8,428	76.5	918.6	1,377.9
			970U	71,763.5	-	114.8	1,377.9	2,066.8

SINGLE PHASE MOTORS

RIGID BASE • CAPACITOR START • GENERAL PURPOSE

LEESON CANADA

OPEN DRIP-PROOF

HP	RPM 60 Hz	NEMA Frame	Catalogue Number	List Price	Disc Sym	App Wgt (lbs.)	Voltage	Over-load Prot	FL Amps 230V	"C" Dim (in.)
1½	3450	56	**110361**	$357	A	29	115/208-230	None	8.6	10.88
	3450	56	**110110**	388	A	29	115/208-230	Man.	8.6	10.88
	3450	56	**113631**☆	482	A	36	115/208-230	Man	6.7	11.38
	3450	143T	**120107**	380	A	32	115/208-230	None	8.6	11.28
	1725	56H	**110005**☆□	452	A	45	115/208-230	None	8.6	11.88
	1725	56H	**110006**☆□	482	A	45	115/208-230	Man.	8.6	11.88
	1725	56H	**113266**☆□	536	A	42	115/208-230	Man.	6.7	12.38
	1725									
	1725	145T	**120042**☆	475	A	40	115/208-230	None	8.6	12.28
	1725	145T	**120004**☆	506	A	39	115/208-230	Man.	8.6	12.28
	1725	145T	**120001**☆	506	A	45	115/208-230	Auto	8.6	12.28
	1140		...							
2	3450	56	**110363**	439	A	38	115/208-230	None	12.0	11.88
	3450	56	**110362**	469	A	38	115/208-230	Man	12.0	12.38
	3450	56	**113632**✧	549	A	38	115/208-230	Man	8.6	11.38
	3450	145T	**120106**	462	A	40	115/208-230	None	12.0	12.28
	3450		...							
	1740									
	1740	145T	**120045**	513	A	47	115/208-230	None	12.8	13.31
	1725	145T	**120879**☆	653	A	47	115/208-230	Man	8.6	13.31
	1725	182T	**131515**	650	A	64	115/208-230	None	12.4	13.19
	1740		...							
	1725	182T	**131536**	714	A	63	115/208-230	Man.	12.4	13.19
	1725	182T	**131535**	714	B	58	115/208-230	Auto.	12.4	13.19
3	3450	56	**110222**	457	A	38	230	Man	15.0	12.38
	3450		...							
	3450	182T	**131636**	738	A	57	115/208-230	None	16.0	14.69
	1725	184T	**131534**	721	A	75	115/208-230	None	16.8	14.19
	1725	184T	**131561**	785	A	75	115/208-230	Man	16.8	14.19
	1725	184T	**131530**	785	A	75	115/208 230	Auto	16.8	14.19
5	3450	56	**111275**☆∑◈	593	A	47	230	Man	20.8	13.38
	3450	145T	**120554**☆∑	599	A	48	230	Man.	20.8	13.31
	3450	184T	**131616**	832	A	70	230	None	24.0	15.69
	1740									
	1725	184T	**131537**☆	832	A	82	230	None	21.0	14.69
	1725	184T	**131560**☆	861	A	82	208	None	23.2	14.69
	1740									
7½	1740	215T	**140155**☆†	1109	A	131	230	None	36.0	17.25
	1740									
10	1740	215TZ	**140311**☆†✓	1606	A	166	230	None	43.0	19.75
	1740									

TOTALLY ENCLOSED FAN COOLED

NEMA Frame	Catalogue Number	List Price	Disc Sym	App Wgt (lbs.)	Voltage	Over-load Prot	FL Amps 230V	"C" Dim (in.)
56	**110094**	$394	A	34	115/208-230	None	8.5	12.31
56	**110109**	424	A	34	115/208 230	Man	8.5	12.31
143T	**120130**	417	A	34	115/208-230	None	8.5	13.25
56H	**110253**☆□	475	A	39	115/208-230	None	8.6	12.81
56H	**M009089**☆✻	384	A	47	115/208-230	Man	9.0	13.31
56H	**110019**☆□	506	A	43	115/208-230	Auto	8.6	12.81
145T	**120026**☆	499	A	42	115/208-230	None	8.6	13.25
145T	**120009**☆	529	A	40	115/208-230	Man	8.6	13.25
184T	**131526**	807	A	76	115/208-230	None	11.0	15.38
56H	**110352**□✣†	497	A	44	115/208-230	None	10.0	13.31
56H	**110402**□✣†	527	A	44	115/208-230	Man	10.0	13.31
145T	**120036**✣†	520	A	44	115/208-230	None	10.0	13.75
145T	**120395**✣†	551	A	44	115/208-230	Man.	10.0	13.75
56HZ	**M009090**☆✻■	405	A	50	230	Man	9.5	14.25
		...						
145T	**120867**☆	551	A	45	115/208-230	Man	9.2	13.75
182T	**131509**	772	A	70	115/208-230	None	12.4	13.47
182T	**131541**†✻	700	A	67	115/208-230	Man.	12.4	13.47
145T	**M019341**	409	A	48	230	None	12.5	13.75
145T	**120341**☆	642	A	48	230	None	14.0	13.75
182T	**131637**	941	A	63	115/208-230	None	16.0	15.96
184T	**131533**	805	B	91	115/230	None	16.8	15.47
184T	**131542**†✻	850	A	99	230	Man	19.0	15.47
184T	**131549**☆	1118	B	81	230	None	19.8	16.96
184T	**131638**†☆	999	B	103	230	None	23.0	16.47
184T	**131543**†☆✻✣	1018	A	106	230	Man	23.0	17.38
215T	**140130**†☆✻✣	1418	A	140	230	Man.	33.6	20.13
	...							
215T	**140414**†☆✻✣	1455	A	202	230	Man	40.0	20.63

■ Combination 56HZ base has mounting holes for NEMA 56 and 143-5T and a standard NEMA 145T frame shaft of 7/8" diameter.
Combination 56H base motors have mounting holes for NEMA 56 and NEMA 143-5T and a standard NEMA 56 shaft.

✻ Capacitor start-capacitor run design for reduced amperage. others are capacitor start-induction run.

◈ Special BA dimension 2.31 inches for belt guard clearance.

✓ Motor with standard diameter shaft 1.0" longer than standard.

† Class F insulated.

✣ These Totally Enclosed Single Phase Motors have 1.15 Service Factors.

∑ These motors are compressor duty rated, may be used at 1.0 Service Factor on general purpose applications.

✻ Hi-torque Farm Duty type motors.

Catalogue numbers in blue are NEW items.

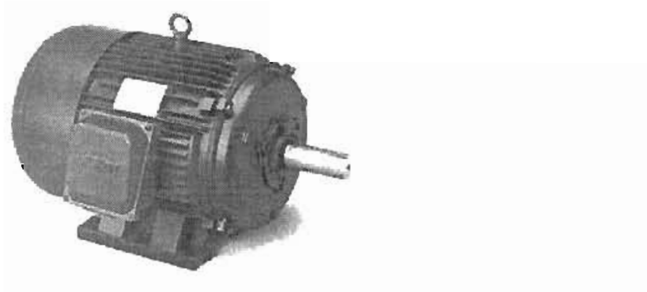
TOTALLY ENCLOSED NON-VENTILATED (TENV)

HP	RPM 60 Hz	NEMA Frame	Catalogue Number	List Price	Disc Sym	App Wgt (lbs.)	Voltage	Over-load Prot	FL Amps 230V	"C" Dim (in.)
1/6	3450	42	**092011**	$253	A	16	115/208-230	None	1.3	9.56
	1725	42	**092012**	263	A	17	115/208-230	None	1.8	10.56
1/4	3450	42	**092013**	272	A	20	115/208-230	None	1.7	10.56
	1725	48	**100361**	261	A	20	115/208-230	None	2.1	9.56
	1725	56	**110008**✣	273	A	27	115/208-230	None	2.4	9.88
	1725	56	**110014**✣	291	A	27	115/208-230	Auto	2.4	9.88
1/3	3450	48	**100362**	292	A	23	115/208-230	None	2.1	10.06
	3450	56	**100363**	322	A	23	115/208-230	Man.	2.1	11.31
	1725	56	**110010**✣	299	A	29	115/208-230	None	2.9	9.88
	1725	56	**110020**✣	329	A	29	115/208-230	Man	2.9	9.88
	1725	56	**110015**✣	329	A	29	115/208-230	Auto.	2.9	9.88
1/2	3450	48	**100366**	320	A	24	115/208-230	None	3.0	10.56

LEESON CANADA

575 VOLT MOTORS

THREE PHASE • RIGID MOUNT • GENERAL PURPOSE



575 VOLT • OPEN DRIP-PR[illegible]

[illegible]	RPM 60 Hz	NEMA Frame	Catalogue Number	[illegible] Price					[illegible]	F.L. Eff	"C" Dim (in.)
3	3450	145T	G120169	5520	[illegible]					84.0	12.88
	3450		[illegible]								
	1740	182T	G130442	525	[illegible]		[illegible]	[illegible]		86.5	12.69
	1740		[illegible]								
	1140	213T	C141023	1512	[illegible]	[illegible]	[illegible]				16.38
	850	215T	C141021	1653	H	[illegible]	[illegible]				17.87
5	3450	182T	G161333	518	[illegible]		[illegible]			85.5	15.13
	1740										
	1740	184T	G130443	548	[illegible]	[illegible]	[illegible]	[illegible]		87.5	13.69
	1140	215T	C141024	1653	H	[illegible]	[illegible]				17.87
	840	254T	C150832	2029	H	[illegible]	[illegible]				20.87
7½	3450		[illegible]								
	3450										
	1750	213T	160209	620	C	163	575	[illegible]	[illegible]	88.5	16.38
	1170	254T	C150836	2029	H	250	575	[illegible]		88.5	20.87
	1170	[illegible]	[illegible]								
	840	256T	C150833	2231	H		575				22.52
	720	284T	*		H		575				23.54
10	3450		[illegible]								
	3450										
	1760	215T	160211	773	C	165	575	[illegible]	90.0	89.5	17.87
	1170	256T	C150837	2231	H	285	575	[illegible]		90.2	22.52
	1170										
	840	284T	C160673	2476	H		575				23.54
	720	286T	*		H		575				25.00
15	3450		[illegible]								
	3450										
	1760	254T	160216	1036	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	91.0	20.87
	1170	284T	C160677	2476	H	[illegible]	[illegible]	[illegible]		90.2	23.54
	840	286T	C160674	2822	[illegible]		[illegible]				25.00
	720	324T	*		[illegible]		[illegible]				26.02
20	3450										
	1760	256T	G150046	1251		[illegible]	[illegible]	[illegible]	[illegible]	92.4	22.52
	1170	286T	C160678	2822	[illegible]			[illegible]		90.2	25.00
	840	324T	C170520	[illegible]	[illegible]						26.02
	720	326T	*				[illegible]				27.52
25	3450		G151536	1478							
	1770	284T	G150048	1495				[illegible]	[illegible]	93.0	23.54
	1170	324T	C170524	[illegible]				[illegible]			26.02
	840	326T	C170521	[illegible]							27.52
	720	364T	*								27.87

575 VOLT • TOTALLY ENCLOSED FAN COOLED

NEMA Frame	Catalogue Number	List Price	Disc Sym	App Wgt. (lbs.)	Voltage	F.L. Amps 575V	3/4 F.L. Eff	F.L. Eff	"C" Dim (in.)
145T	120423	$557	A	41	575	2.9		85.5	13.25
182T	G161329	506	C	58	575	3.0		85.5	16.14
182T	131460	631	A	60	575	3.3		87.5	12.97
182T	G151321	463	C	94	575	3.4	87.5	87.5	16.14
213T	171380 [W]	853	H	147	575	3.9	87.6	88.5	18.20
215T	151374-22	1833	H	168	575	4.4		84.1	19.60
184T	G161331	562	C	100	575	4.8	88.0	87.5	16.14
184T	131461	719	A	71	575	5.5		87.5	13.97
184T	G151323	530	C	101	575	5.5	87.9	87.5	16.14
215T	171381 [W]	1094	C	168	575	6.4	88.0	88.5	19.60
254T	150750-22	2263	H	188	575	7.2		88.3	23.23
213T	G150196	713	C	150	575	7.2	89.3	88.5	18.20
213T	170196 [W]	912	C	147	575	7.1	89.8	89.5	18.20
213T	G150207	689	C	153	575	7.7	90.0	89.5	18.20
254T	G150215	1172	C	250	575	8.0	90.0	89.5	23.23
254T	170215 [W]	1532	C	249	575	8.4	90.4	90.2	23.23
256T	150281-22	2503	H	290	575	9.7		87.7	24.96
284T	*		H		575				26.26
215T	G150197	842	C	167	575	9.4	90.4	89.5	18.20
215T	170197 [W]	1052	C	168	575	9.2	91.0	91.0	18.20
215T	G150212	788	C	176	575	10.1	91.0	89.5	19.60
256T	G150219	1462	C	277	575	10.5	90.0	89.5	24.96
256T	170219 [W]	1891	C	276	575	11.2	90.2	90.2	24.96
284T	150283-22	3095	H	460	575	13.0		88.8	26.26
286T	*		H		575				28.30
254T	G150198	1216	C	260	575	14.0	90.5	90.2	23.23
254T	170198 [W]	1506	C	262	575	14.0	91.4	91.7	23.23
254T	G150116	1199	C	277	575	14.7	91.5	91.0	23.23
284T	G150222	2056	C	346	575	16.2	90.0	90.2	26.26
286T	150262-22	3434	H	480	575	18.5		91.0	27.83
324T	*		H		575				29.53
256T	G150199	1602	C	296	575	18.4	91.0	90.2	24.96
256T	G150117	1413	C	321	575	19.3	91.7	91.0	24.96
286T	G150226	2318	C	381	575	21.0	90.4	90.2	27.83
324T	150264-22	4236	H	640	575	25.6		91.0	29.53
326T	*		H		575				31.02
284TS	G150224	1981	C	349	575	23.3	91.0	91.0	24.88
284T	G150118	1760	C	370	575	23.6	92.4	92.4	26.26
324T	G150230	3016	C	494	575	25.9	92.0	91.7	29.53
326T	150266-22	4954	H	700	575	30.4		91.2	31.02
364T	*		H		575				32.64

All motors on this page have a 1.15 Service Factor.

[illegible] Efficiency WATTS AVER[illegible] [illegible] assigned a Cat[illegible]

CONTINUED ON NEXT PAGE

NOTE: 150,000 series OPEN and TEFC [illegible] converted by reassembly, to F2 condu[illegible]

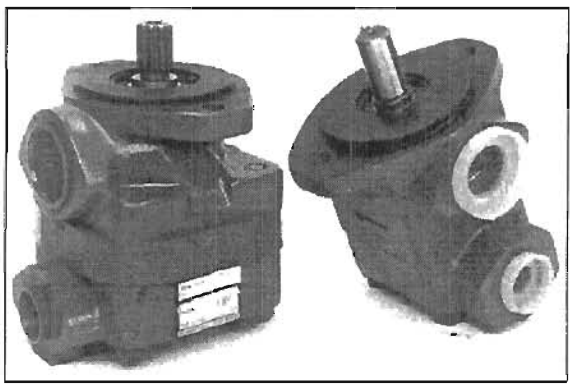
[illegible] 364T can be field

[illegible] FRAME INDICATES CAST IRON CONSTRUCTION

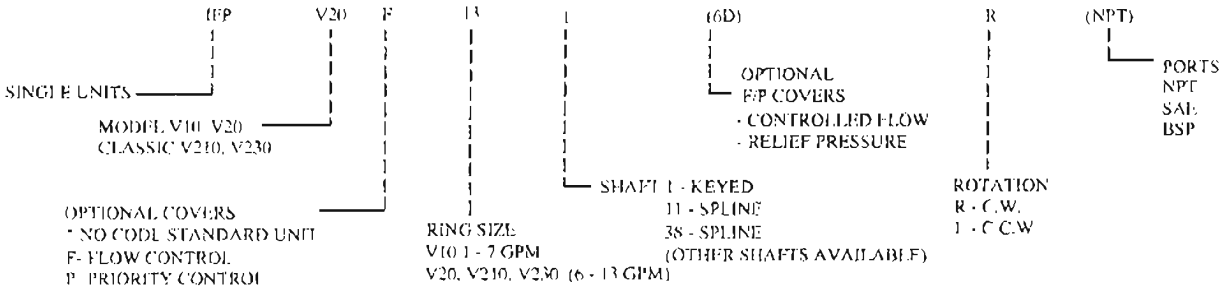
IFP SINGLE VANE PUMPS
V10/V20 - V210/V230

INTERNATIONAL

* High Performance
* Low Cost
* Extended Life
* Versatile
* Compact
* Quiet Operation
* Balanced Cartridge Design



◆ Single Pump Ordering Specifications



Values based on using anti-wear type petroleum oil 150 SUS at 100°F and 0 PSI inlet pressure.

MODEL SERIES	RING SIZE (DELIVERY USgpm @ 1200 R/MIN & 100 PSI)	DISPL. in³/r	MAXIMUM SPEED (RPM)	MAXIMUM PRESSURE (PSI)	TYPICAL DELIVERY (USgpm) @ max.speed & pressure	TYPICAL INPUT POWER (HP) @ max. speed & pressure	WEIGHT (lbs.)
V10	1	0.20	4800	2500	3.60	07.0	(10 - 15)
	2	0.40	4800	2500	7.30	13.6	
	3	0.60	4000	2500	9.40	17.8	
	4	0.80	3400	2500	10.9	20.3	
	5	1.00	3200	2500	12.8	22.8	
	6	1.19	3000	2500	14.6	26.0	
	7	1.39	2800	2500	16.0	28.0	
V20 V210 V230	6	1.19	3400	2500	16.1	29.0	(16 - 18)
	7	1.39	3000	2500	16.7	29.5	
	8	1.62	2800	2500	17.7	32.5	
	9	1.80	2800	2500	19.8	35.5	
	11	2.23	2500	2500	22.9	37.5	
	12	2.38	2400	2500	23.0	38.5	
	13	2.59	2400	2500	25.9	42.0	

IFP offers a complete line of economical high performance fixed displacement vane pumps providing flows up to 26 US GPM for mobile and industrial applications. Balanced vane design provides quiet operation, high efficiency and long service life for the toughest applications. Units are designed for use with oil or synthetic fire resistent fluid. A large combination of Spline/Keyed Shafts and factory tested cartridges are available for fast, easy conversion and repair. Units are self-priming. However, before starting, fill the pump with system fluid through uppermost port. The housing must be kept full at all times to provide internal lubrication.

IFP V10 SINGLE VANE PUMP
INSTALLATION DIMENSION

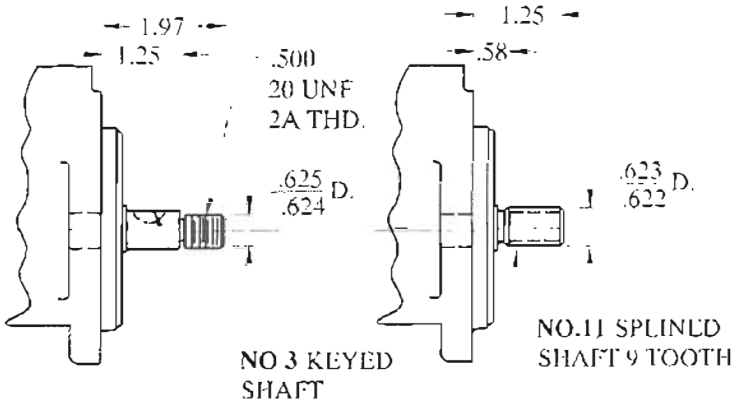
INTERNATIONAL

DIMENSION (inches)

DELIVERY @ 1200 RPM & 100 PSI	[illegible]			
	A			
1 GPM				
2 GPM				
3 GPM				
4 GPM				
5 GPM				
6 GPM				
7 GPM				

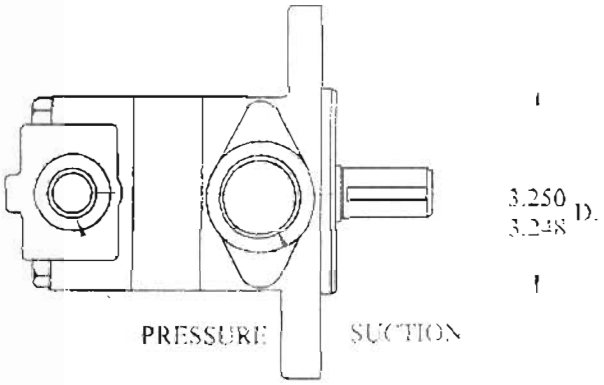
Weight 10 - 15 lbs
Pressure: 1/2" NPT
Suction: 1" NPT
Optional BSPT/SAE Ports available.

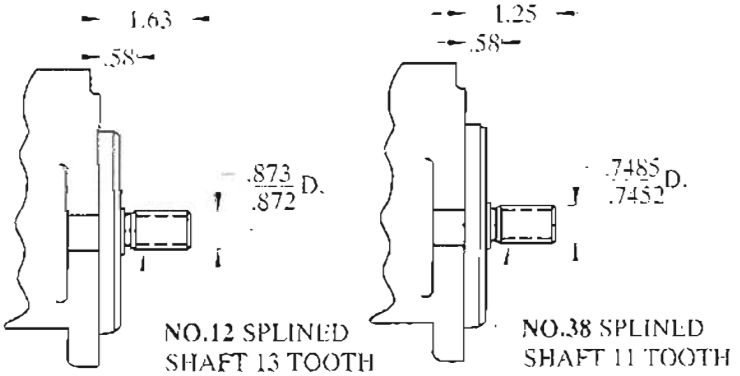
V10 series
Optional Shafts



NO 3 KEYED SHAFT

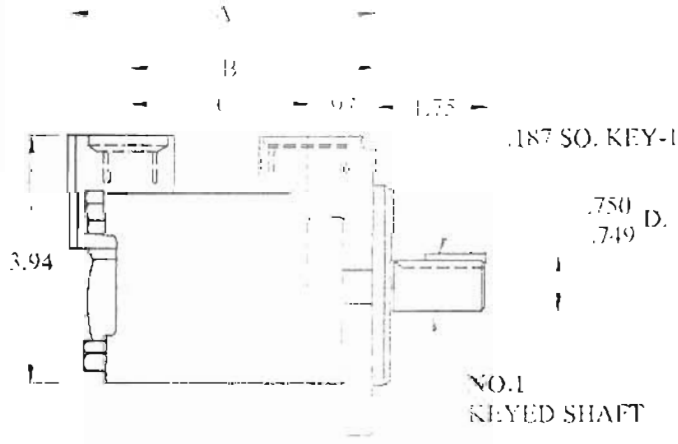
NO.11 SPLINED SHAFT 9 TOOTH



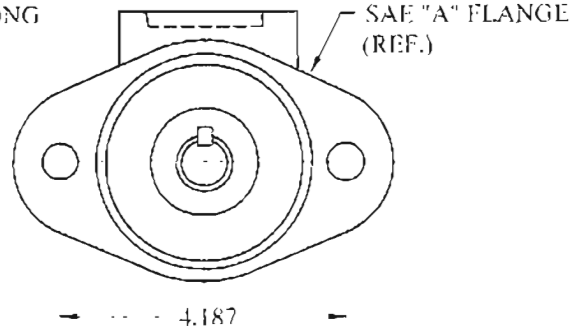


NO.12 SPLINED SHAFT 13 TOOTH

NO.38 SPLINED SHAFT 11 TOOTH



NO.1 KEYED SHAFT



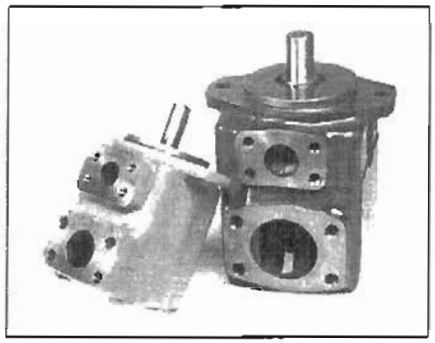
Foot Bracket as [illegible]
Part # - IFB [illegible]

FLOW CONTROL [illegible] COVERS AVAILABLE.
(SEE Page [illegible])

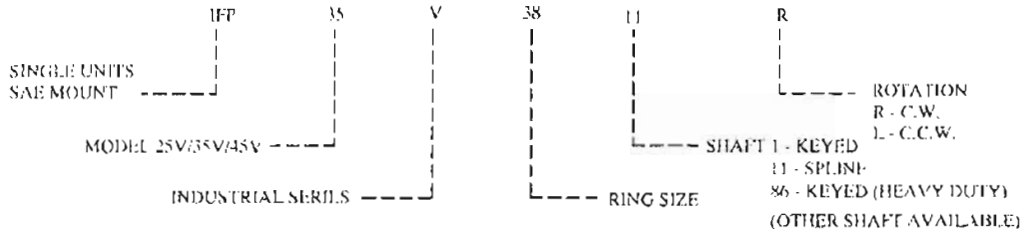
IFP HIGH PERFORMANCE INDUSTRIAL SINGLE INTRA-VANE PUMPS

INTERNATIONAL

* High Volumetric Efficiency
* Maximum 3000 PSI Operating Pressure
* Twelve Vane Design for Quiet Operation
* Hydraulically Balanced for Extended Life
* Versatile
* Compact



◆ Single Pump Ordering Specifications



Values based on using anti-wear type petroleum oil 150 SUS at 100°F and 0 PSI inlet pressure.

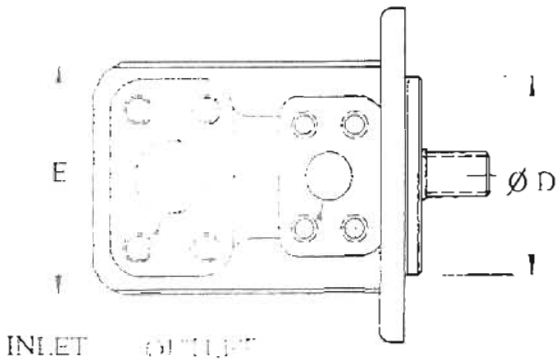
MODEL SERIES	FLOW IN GPM @ 1200 RPM & 100 PSI	DISPL. in³/r	MAXIMUM SPEED (RPM)	MAXIMUM PRESSURE (PSI)	TYPICAL DELIVERY GPM @ max.speed & pressure	TYPICAL INPUT POWER (HP)@ max. speed & pressure	WEIGHT (lbs.)
20V	8	1.10	1800	3000	7.5	15.00	26
	8	1.67	1800	3000	12	22.78	
	11	2.22	1800	3000	15	30.28	
	12	2.47	1800	3000	16.4	33.69	
	14	2.78	1800	3000	18.4	37.91	
25V	12	2.47	1800	2500	16.4	30.28	32
	14	2.78	1800	2500	18.4	34.50	
	17	3.39	1800	2500	22.8	40.00	
	21	4.13	1800	2500	28	45.60	
35V	21	4.13	1800	2500	28	45.60	50
	25	4.94	1800	2500	33	61.00	
	30	5.91	1800	2500	40.8	73.00	
	35	6.83	1800	2500	48	82.40	
	38	7.37	1800	2500	51.2	88.30	
45V	42	8.41	1800	2500	55.0	101.00	75
	50	9.88	1800	2500	67	117.00	
	60	11.75	1800	2500	82	139.00	

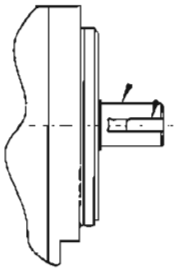
IFP offers a complete line of high performance (12 vane) single intra-vane pumps for industrial applications. Units are available with a large selection of SAE mounts and shafts. The high pressure capability and multiple displacements, combined with the low flow pulsation and quiet operating characteristics of this 12-vane design, makes them ideal for industrial applications. Factory tested cartridges kits are readily available, providing efficient field serviceability, avoiding costly down time and increasing productivity. These units can operate on a wide variety of fluids.

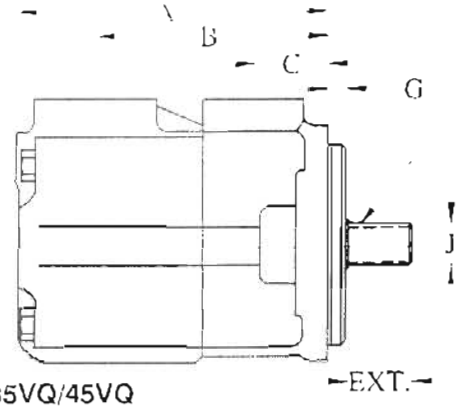
Contact the local representative with your requirements.

IFP MOBILE & INDUSTRIAL SINGLE PUMP INSTALLATION DIMENSIONS

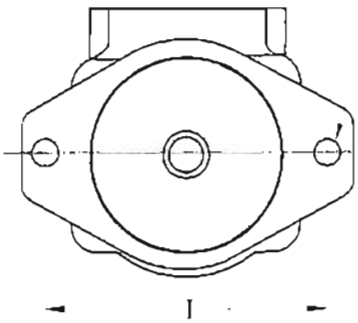
INTERNATIONAL



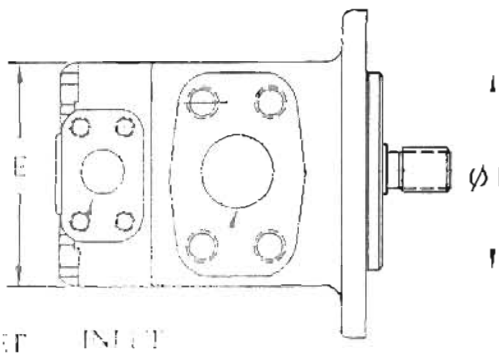


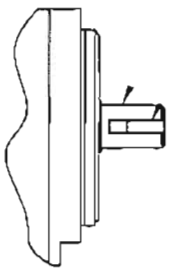


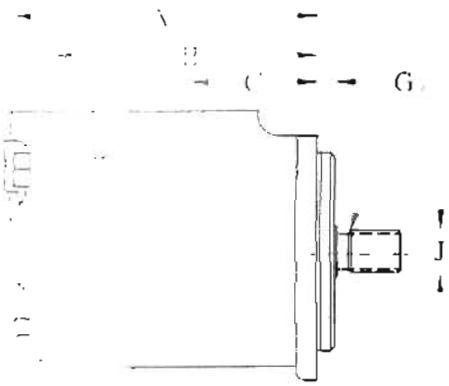
NO.11
SPLINED SHAFT



IFP 25V/35V/45V
IFP 25VQ/30VQ/35VQ/45VQ







NO.151
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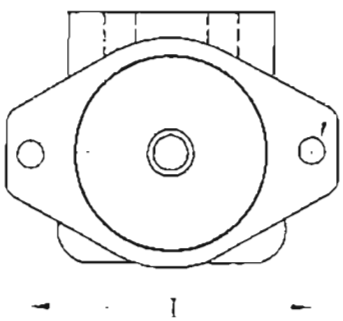


IFP 20V/20VQ

General Description

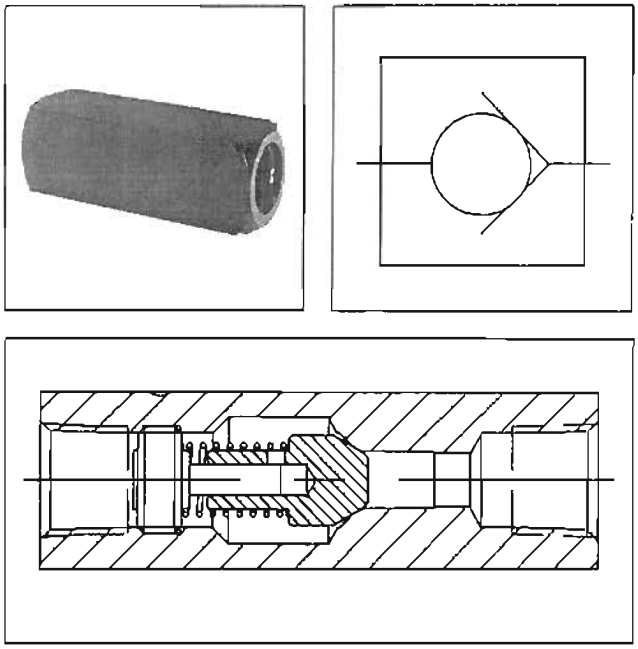
Series "C" check valves permit free flow in one direction, and dependable shut-off in the reverse direction.

Operation

When pressure going throught the valve is increased to the cracking level the valve opens. When the pressure is reduced to below the cracking level the valve closes.

Features

- Stainless steel poppets standard.
- Soft seal poppets are available.
- Triangular retainers guide the poppets, and hold the spring firmly in place even under high velocity and shock.

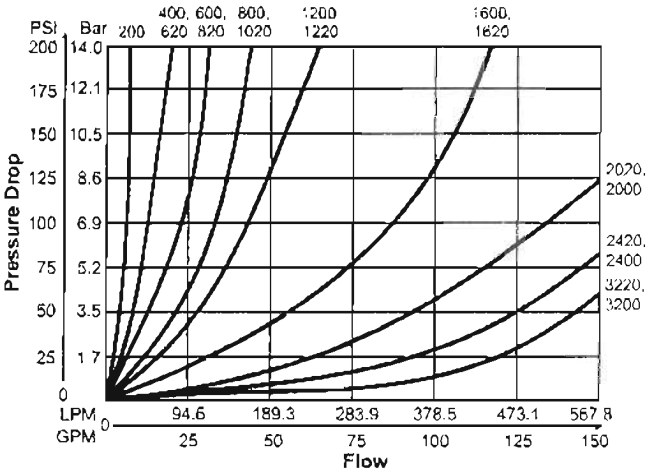


Specifications

Maximum Operating Pressure	Brass:	140 Bar (2000 PSI); except for C1600 brass which is 35 Bar (500 PSI)
	Steel:	345 Bar (5000 PSI) for 200 thru 1220; 207 Bar (3000 PSI) for all other sizes and styles
Maximum Flow	C200:	11 LPM (3 GPM)
	C400:	19 LPM (5 GPM)
	C600:	30 LPM (8 GPM)
	C620:	19 LPM (5 GPM)
	C800:	57 LPM (15 GPM)
	C820:	30 LPM (8 GPM)
	C1020:	57 LPM (15 GPM)
	C1200:	95 LPM (25 GPM)
	C1220:	95 LPM (25 GPM)
	C1600:	151 LPM (40 GPM)
	C1620:	151 LPM (40 GPM)
	C2000:	265 LPM (70 GPM)
	C2020:	265 LPM (70 GPM)
	C2400:	379 LPM (100 GPM)
	C2420:	379 LPM (100 GPM)
	C3200:	569 LPM (150 GPM)
	C3220:	569 LPM (150 GPM)

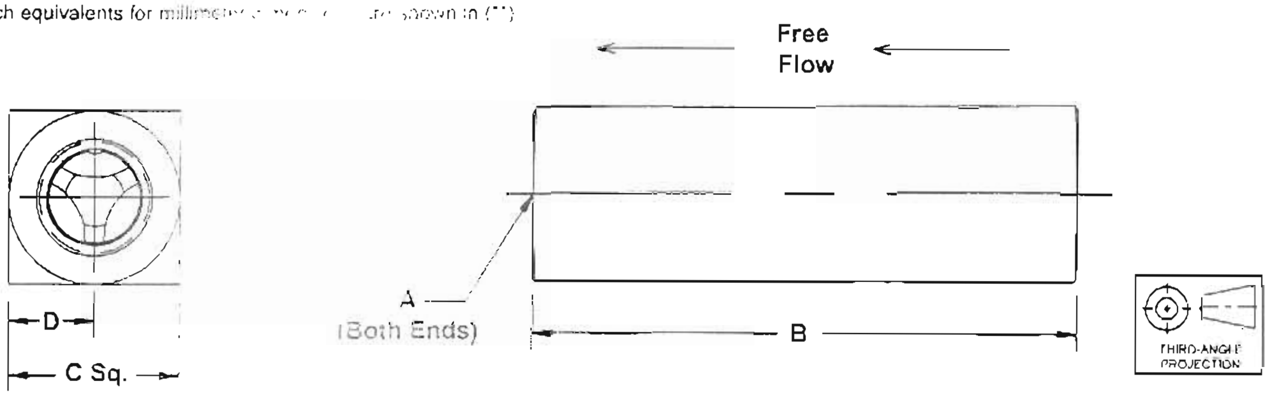
Performance Curves

Controlled Flow vs. Pressure Drop
Free Flow 0.3 Bar (5 PSI) Cracking
100 SSU, Hydraulic Oil



Dimensions

*Inch equivalents for millimeter dimensions are shown in (**)



Model Number	A	B	C	D
C200	1/8–27 NPTF	50.8 (2.00)	16.0 (0.63)	7.9. (0.31)
C400	1/4–18 NPTF	66.8 (2.63)	20.6 (0.81)	10.4 (0.41)
C420	7/16–20 UNF #4 SAE	68.3 (2.69)	20.6 (0.81)	10.4 (0.41)
C600	3/8–18 NPTF	69.9 (2.75)	25.4 (1.00)	12.7 (0.50)
C620	9/16–18 UNF #6 SAE	79.2 (3.12)	25.4 (1.00)	12.7 (0.50)
C800	1/2–14 NPTF	87.4 (3.44)	31.8 (1.25)	16.0 (0.63)
C820	3/4–16 UNF #8 SAE	88.9 (3.50)	28.4 (1.12)	14.2 (0.56)
C1020	7/8–14 UNF #10 SAE	101.6 (4.00)	31.8 (1.25)	15.7 (0.62)
C1200	3/4–14 NPTF	98.6 (3.88)	38.1 (1.50)	19.1 (0.75)
C1220	1 1/6–12 UN #12 SAE	117.3 (4.62)	38.1 (1.50)	19.1 (0.75)
C1600	1–11 1/2 NPTF	127.0 (5.00)	44.5 (1.75)	22.4 (0.88)
C1620	1 5/16–12 UN #16 SAE	142.7 (5.62)	57.2 (2.25)	28.4 (1.12)
C2000	1 1/4–11 1/2 NPTF	143.0 (5.63)	57.2 (2.25)	28.7 (1.13)
C2020	1 5/8–12 UN #20 SAE	165.1 (6.50)	69.9 (2.75)	35.1 (1.38)
C2400	1 1/2–11 1/2 NPTF	143.0 (5.63)	69.9 (2.75)	35.1 (1.38)
C2420	1 7/8–12 UN #24 SAE	184.2 (7.25)	76.2 (3.00)	38.1 (1.50)
C3200	2–11 1/2 NPTF	165.1 (6.50)	88.9 (3.50)	44.5 (1.75)
C3220	2 1/2–12 UN #32 SAE	228.6 (9.00)	101.6 (4.00)	50.8 (2.00)

Ordering Information

[ ] C [ ] [ ] [ ] [ ] [ ]

Options — Series C — Size — Material — Cracking Pressure (nominal) — Seal Compound — Design Series (Not required for ordering)

Options

Code	Description
Omit	Standard
8	BSPT
9	BSPP

Size

200 *	800 *†	1600 *	2400
400 *†	820	1620	2420
600 *†	1020	2000	3200
620	1200 *	2020	3220
	1220		

* Sizes available in ...
† Sizes available in ...

Material

Code	Description
B	Brass
S	Steel
* SS	Stainless Steel

... Brass Valves can be used for both air and oil service.
... available in 400, 600 and 800 ...

Cracking Pressure (nominal)

Code	Description
Omit	Standard (0.4 Bar (5 PSI)
65	4.5 Bar (65 PSI)

Seal Compound

Code	Description
Omit	Nitrile (Standard)
V	Fluorocarbon

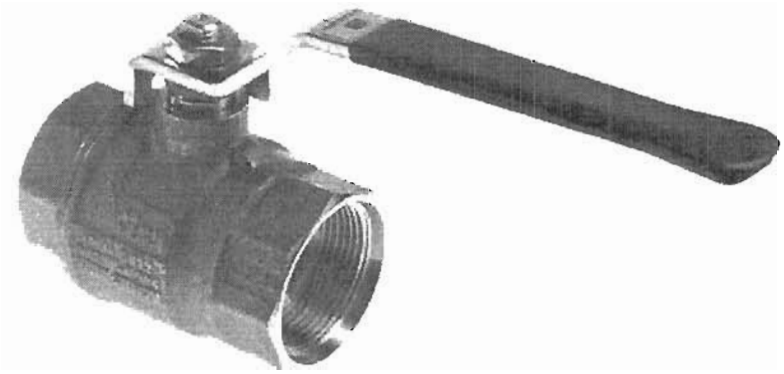
Model Number	Weight Kg (lbs.)	Model Number	Weight Kg (lbs.)	Model Number	Weight Kg (lbs.)	Model Number	Weight Kg (lbs.)
C200	0.0 (0.1)	C820	0.3 (0.7)	C1600	1.5 (3.3)	C2400	3.8 (8.4)
C400	0.2 (0.4)	C1020	0.6 (1.3)	C1620	1.5 (3.3)	C2420	3.8 (8.4)
C600	0.2 (0.5)	C1200	0.9 (2.0)	C2000	2.8 (6.2)	C3200	7.0 (15.4)
C620	0.2 (0.5)	C1220	0.9 (2.0)	C2020	2.8 (6.2)	C3220	7.0 (15.4)
C800	0.6 (1.3)						

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio 44035 USA

Low Pressure Valves 2BVL Series - Brass

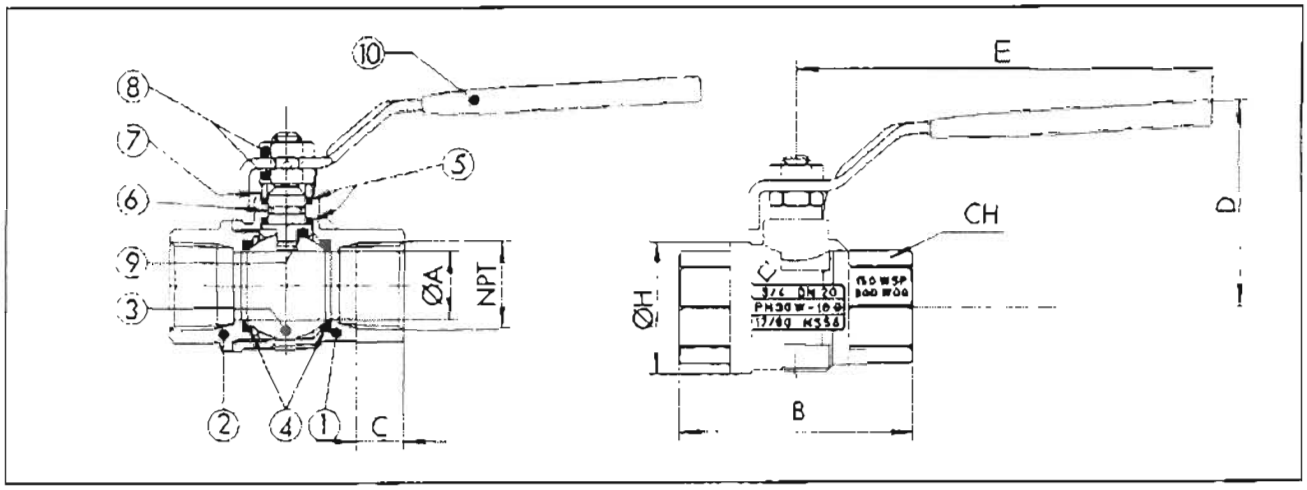
Specifications

- Brass Hot Stamping with Chrome Plated Brass Ball ¼" to 4"
- Pressure Rating to 600 PSI (WOG) (40 bar)
- Blow Out Proof Stem
- Teflon Seats, Seals & Thrust Washer
- Temperature to 320°F (160°C)
- Metal Handle ¼" to 2"
- Aluminum Handle 2½" to 4"
- All Valves are Full Port.



Options

- Limit Switches
- Locking Handles

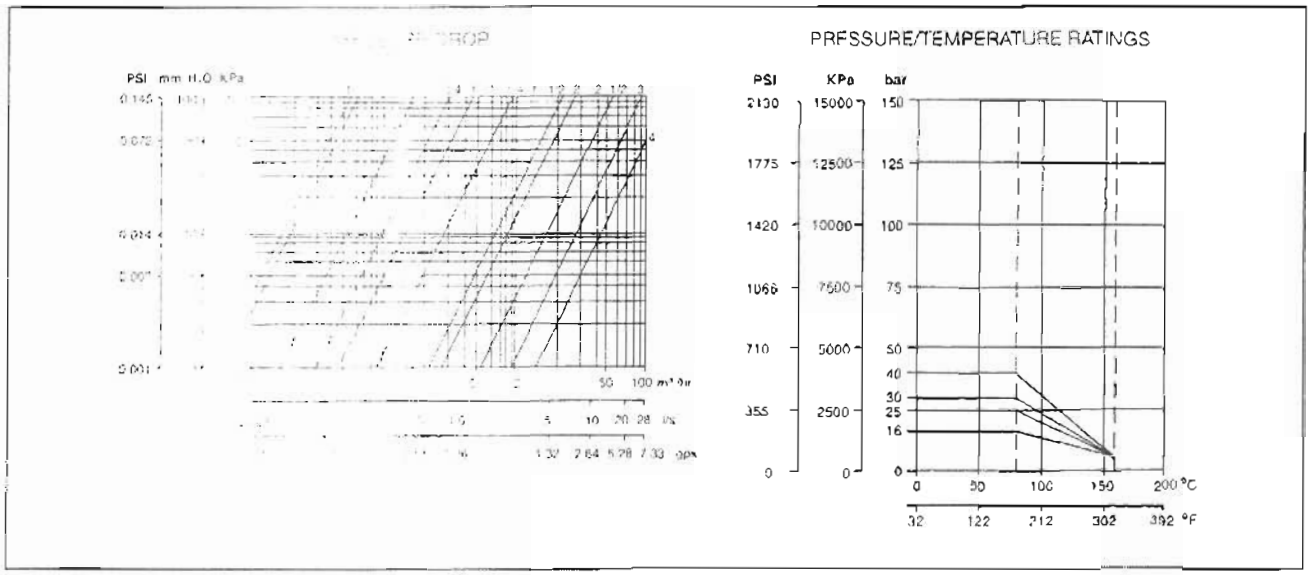


N Pos	Part Name	Materials	N Pcs.
1	BODY	BRASS UNI 5707-65	1
2	END CONNECTION	BRASS UNI 5705-65	1
3	BALL	BRASS UNI 5705-65	1
4	SEAT MATERIAL	P.T.F.E.	2
5	STEM SEALS	P.T.F.E.	2
6	O-RING	NBR 75 Sh A	1
7	PACKING GLAND	BRASS UNI 5705-65	1
8	NUT	PLATED STEEL	2
9	STEM	BRASS UNI 5705-65	1
10	LEVER HANDLE	PLATED STEEL	1

Dimensional Information

Part No.	Size NPT		ØA	C	B	ØH	CH	E	D	CV Factor	PSI Bar	Lbs Kg
2BVL-20 04 B	¼"	in	0.39	0.39	2.02	0.90	0.78	3.85	1.75	6.29	600	0.30
		mm	10	10	51.5	23	20	98	44.5		40	0.14
2BVL-20 06 B	⅜"	in	0.39	0.40	2.02	0.90	0.78	3.85	1.75	6.99	600	0.28
		mm	10	10	51.5	23	20	98	44.5		40	0.13
2BVL-20 08 B	½"	in	0.59	0.53	2.44	1.25	0.98	3.85	1.88	19	600	0.41
		mm	15	13.6	62	32	25	98	48		40	0.19
2BVL-20 12 B	¾"	in	0.78	0.55	2.71	1.53	1.22	4.80	2.26	34.42	600	0.67
		mm	20	14	69	39	31	122	58		40	0.31
2BVL-20 16 B	1"	in	0.98	0.66	3.07	1.92	1.49	4.80	2.44	50.18	600	1.09
		mm	25	16.8	78	49	38	122	62		40	0.50
2BVL-20 20 B	1¼"	in	1.25	0.68	3.42	2.32	1.88	6.02	3.07	103.7	600	2.01
		mm	32	17.3	87	59	48	153	78		40	0.92
2BVL-20 24 B	1½"	in	1.57	0.68	3.89	2.87	2.12	6.02	3.34	268.41	600	3.08
		mm	40	17.3	99	73	54	153	85		40	1.40
2BVL-20 32 B	2"	in	1.96	0.69	4.33	3.38	2.63	6.37	3.79	309.2	600	4.18
		mm	50	17.7	110	86	67	162	96.5		40	190
2BVL-20 40 B	2½"	in	2.56	1.19	5.59	4.37	3.54	8.07	5.02	629	600	8.00
		mm	65	30.2	142	111	90	205	127.5		40	3.66
2BVL-20 48 B	3"	in	3.15	1.31	6.45	5.35	4.13	8.07	5.45	1018.17	600	12.90
		mm	80	33.3	164	136	105	205	138.5		40	5.90
2BVL-20 64 B	4"	in	3.94	1.55	7.60	6.35	5.12	10.23	6.34	1622	600	22.04
		mm	100	39.3	193	166	130	260	161		40	10.0

Technical Information



Replacement Handle	*Contact Factory	R1210	R1211	R1212	R1271 2½"-3" R1272 4"
	FITS ...	FITS ... 1"	FITS 1¼", 1½"	FITS 2"	FITS 2½", 3" 4"
Locking Device	BVLK-04	BVLK-12	BVLK-20	BVLK-32	BVLK-40
	FITS ...	FITS ... 1"	FITS 1¼", 1½"	FITS 2"	FITS 2½", 3", 4"

Order separate from valve

Ordering Information

2BVL 2 0 08 B L

Product Type
2BVL- 2 Piece Low Pressure Valve

No. of Ports
2 - 2

Threads
0-NPT
1-SAE
R - Modified BSP

Port Sizes	
04	¼"
06	⅜"
08	½"
12	¾"
*16	1"
*20	1¼"
*24	1½"
*32	2"
*40	2½"
*48	3"
*64	4"

* SAE Threads Available
- Modified BSP Available

Locking Device
- No Lock
L With Lock
X With Lock & Limit Switch
S With Limit Switch Only

Material
B Brass

Low Pressure SAE Port Adaptors

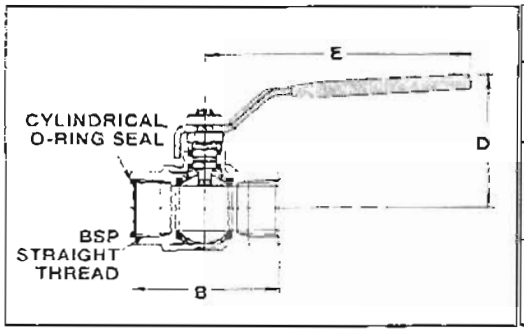
Specifications

- Leak Free O-Ring Sealing to 4" with a Variety of Connection Options:
- Socket Weld
- Hose Barb (Straight 45° & 90°)
- Split Flange
- Carbon Steel Construction
- Lock Nut Design Simplifies the Positioning of Valves and Eliminates Weld Damage to Valve.
- Buna N Seals

Options

- Viton Seals
- Step Sizes Available - Consult Factory

Dimensional Information: 2½"- 4"

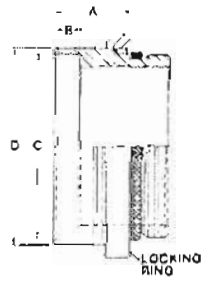


PART NO.	BSP SIZE		B	E	D	PSI BAR	WEIGHT
2BVL-2R 40 B	2½"	in	5.59	8.07	5.02	600	8.00 lb
		mm	142	205	127.5	40	3.65 kg
2BVL-2R 48 B	3"	in	6.45	8.07	5.45	600	12.90 lb
		mm	164	205	138.5	40	5.90 kg
2BVL-2R 64 B	4"	in	7.60	10.23	6.34	600	22.04 lb
		mm	193	260	161	40	10.0 kg

*Note All "O"-rings should be lubricated before assembly.

SWA - SWIVEL SOCKET WELD ADAPTOR

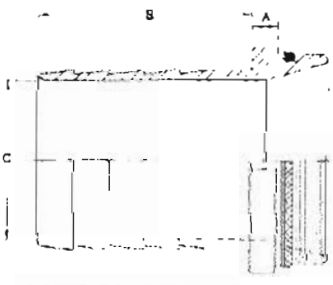
Part no.	Port	Thread	A	B	C	D
SWA - 16LR	1"	1⅝"-12UN-2B	0.88"	0.25"	1.33"	1.63"
SWA - 20LR	1¼"	1⅞"-12UN-2B	0.88"	0.25"	1.67"	2.00"
SWA - 24LR	1½"	2¼"-12UN-2B	0.88"	0.25"	1.91"	2.25"
SWA - 32LR	2"	2½"-12UN-2B	1.00"	0.25"	2.39"	2.75"
SWA - 40LR	2½"	2¾"-11BSP	1.50"	0.50"	2.89"	3.25"
SWA - 48LR	3"	3"-11BSP	1.50"	0.50"	3.51"	3.75"
SWA - 64LR	4"	4"-11BSP	1.50"	0.50"	4.51"	4.75"



*Note: Remove "O" ring before welding, valve should not be installed before welding adaptor

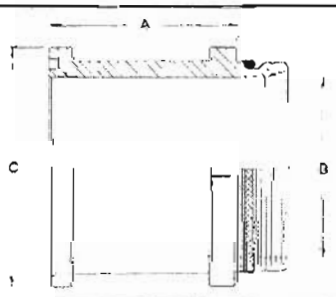
HA - SAE TO HOSE BARB ADAPTOR

Part no.	Port	Thread	A	B	C
HA-16	1"	1⅝"-12UN-2B	0.375"	1.37"	0.84"
HA-20	1¼"	1⅞"-12UN-2B	0.40"	1.90"	1.06"
HA-24	1½"	2¼"-12UN-2B	0.40"	1.94"	1.25"
HA-32	2"	2½"-12UN-2B	0.41"	2.43"	1.70"
HA-40	2½"	2¾"-11BSP	0.46"	3.09"	2.15"
HA-48	3"	3"-11BSP	0.45"	3.62"	2.65"
HA-64	4"	4"-11BSP	0.45"	4.90"	3.65"



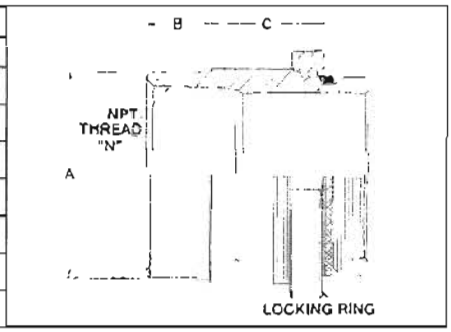
SAS - SAE TO SPLIT FLANGE (CODE 61) ADAPTOR

Part no.	Port	Thread	A	B	C
SAS-16	1"	1⅝"-12UN-2B	2.40"	1.00"	1.75"
SAS-20	1¼"	1⅞"-12UN-2B	2.72"	1.25"	2.00"
SAS-24	1½"	2¼"-12UN-2B	2.72"	1.50"	2.375"
SAS-32	2"	2½"-12UN-2B	2.87"	2.00"	2.812"
SAS-40	2½"	2¾"-11BSP	3.18"	2.50"	3.312"
SAS-48	3"	3"-11BSP	3.18"	3.00"	4.00"
SAS-64	4"	4"-11BSP	3.44"	4.00"	5.00"



SNN - SAE SWIVEL TO NPT FEMALE ADAPTOR

Part no.	Port	Thread	A	B	C
SNN-16	1"		1.63"	0.88"	1.50"
SNN-20	1¼"		1.38"	0.88"	1.56"
SNN-24	1½"		2.25"	0.88"	1.56"
SNN-32	2"		2.75"	0.88"	1.76"
SNN-40	2½"		3.13"	1.00"	1.75"
SNN-48	3"		3.88"	1.00"	1.75"
SNN-64	4"		4.88"	1.00"	1.75"

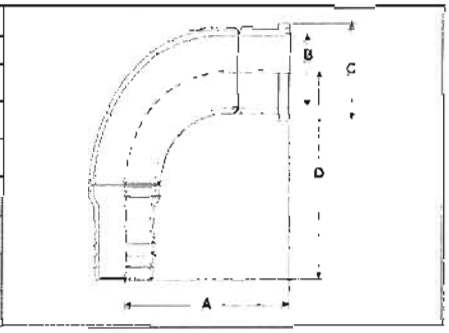


HAS - SPLIT FLANGE TO HOSE BARB ADAPTOR

Part no.	Port	Thread	A	B	C
HAS-16	1"		1.75"	2.63"	0.84"
HAS-20	1¼"		2.00"	3.00"	1.06"
HAS-24	1½"		2.38"	3.00"	1.25"
HAS-32	2"		2.81"	3.25"	1.70"
HAS-40	2½"		3.31"	4.00"	2.15"
HAS-48	3"	CODE 61	4.00"	4.50"	2.65"
HAS-64	4"	CODE 61	5.00"	6.00"	3.65"

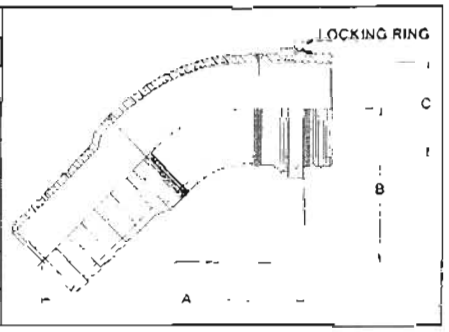
HAS 90° - SPLIT FLANGE TO HOSE BARB ELBOW 90° ADAPTOR

Part no.	Port	A	B	C	D
HAS 90-16	1"	2.75"	1.00"	1.75"	3.63"
HAS 90-20	1¼"	3.25"	1.25"	2.00"	4.63"
HAS 90-24	1½"	3.50"	1.50"	2.38"	5.00"
HAS 90-32	2"	4.25"	2.00"	2.81"	6.25"
HAS 90-40	2½"	5.50"	0.5"	3.31"	7.88"
HAS 90-48	3"	6.38"	3.00"	4.00"	9.00"
HAS 90-64	4"	8.00"	4.00"	5.00"	11.38"



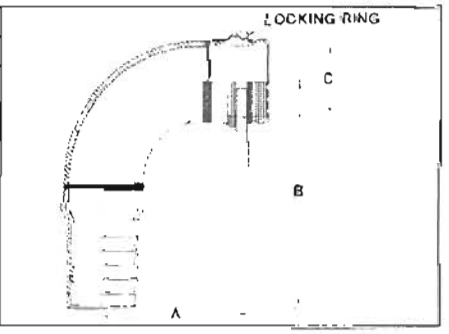
HA 45° - SAE SWIVEL TO HOSE BARB ELBOW 45° ADAPTOR

Part no.	Port	Thread	A	B	C
HA 45-16	1"		3.50"	2.00"	1.00"
HA 45-20	1¼"		4.25"	2.50"	1.25"
HA 45-24	1½"		4.38"	2.50"	1.50"
HA 45-32	2"		5.38"	3.13"	2.00"
HA 45-40	2½"		7.00"	4.00"	2.50"
HA 45-48	3"		8.00"	4.64"	3.00"
HA 45-64	4"		9.50"	5.50"	4.00"



HA 90° - SAE SWIVEL TO HOSE BARB ELBOW 90° ADAPTOR

Part no.	Port	Thread	A	B	C
HA 90-16	1"		2.38"	3.63"	1.00"
HA 90-20	1¼"		2.75"	4.50"	1.25"
HA 90-24	1½"		3.13"	5.00"	1.50"
HA 90-32	2"		4.00"	6.25"	2.00"
HA 90-40	2½"		5.25"	8.06"	2.50"
HA 90-48	3"		6.00"	9.06"	3.00"
HA 90-64	4"		7.75"	11.38"	4.00"

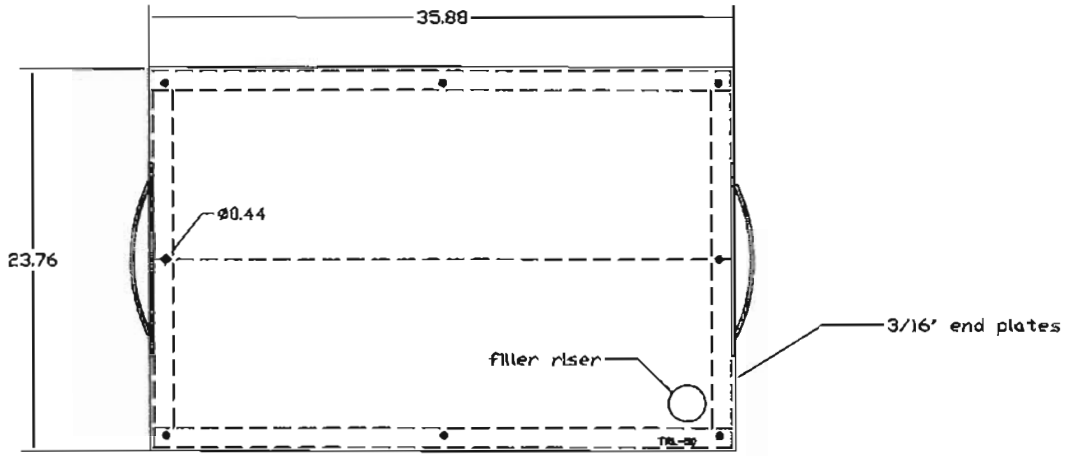


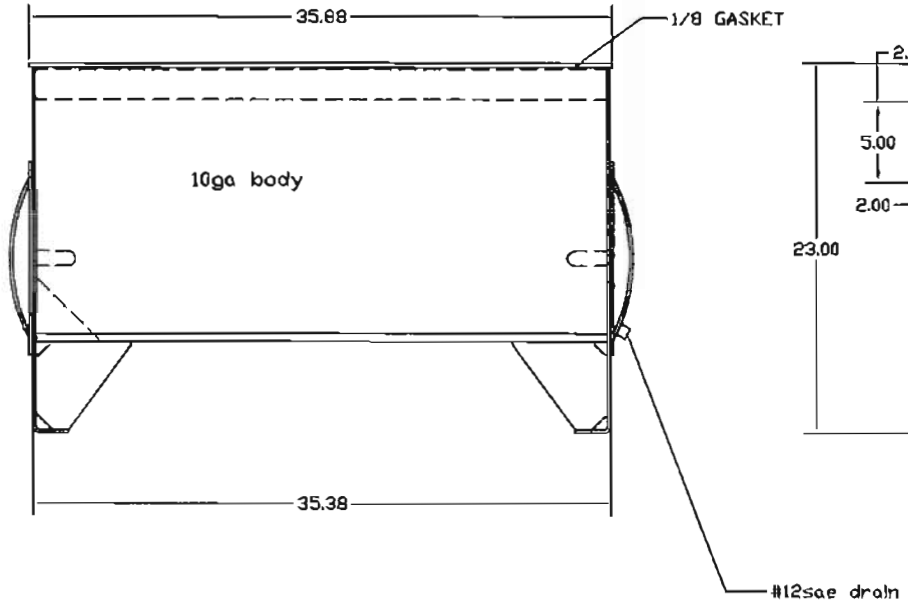
FRECO
FLUID
POWER

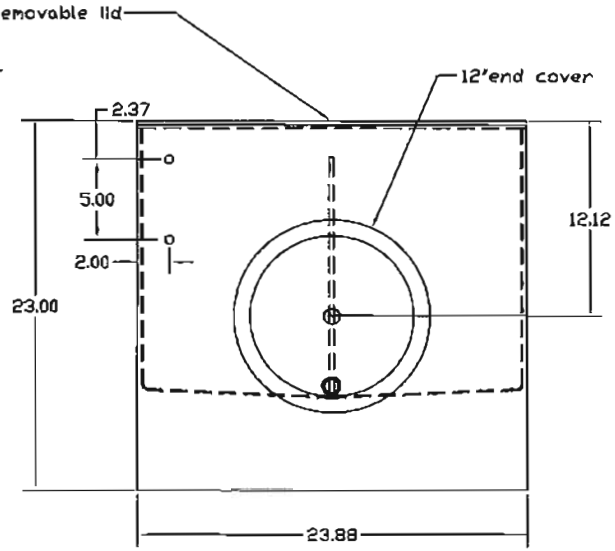
77 Auriga Drive, Unit 9
Nepean, Ont. K2E 7Z7
Tel : (613) 226-1201
Fax : (613) 723-7391

Reservoir Information

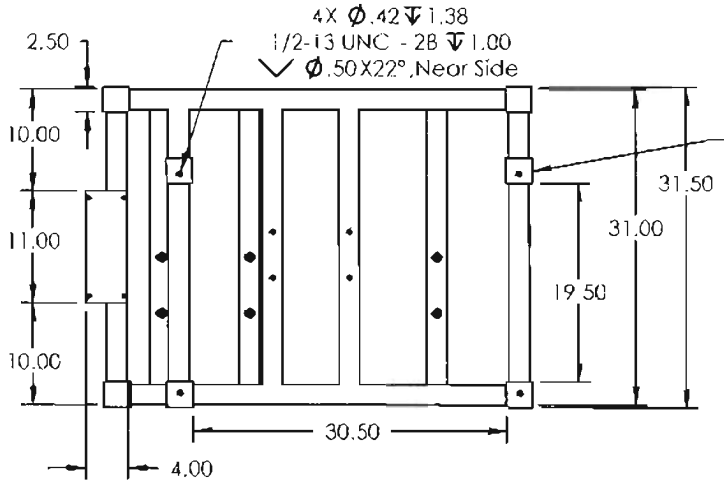
Parker Hydraulics





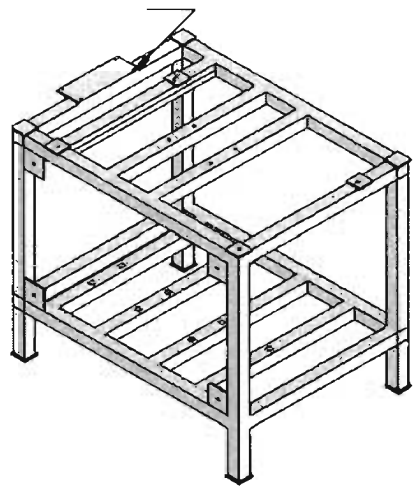


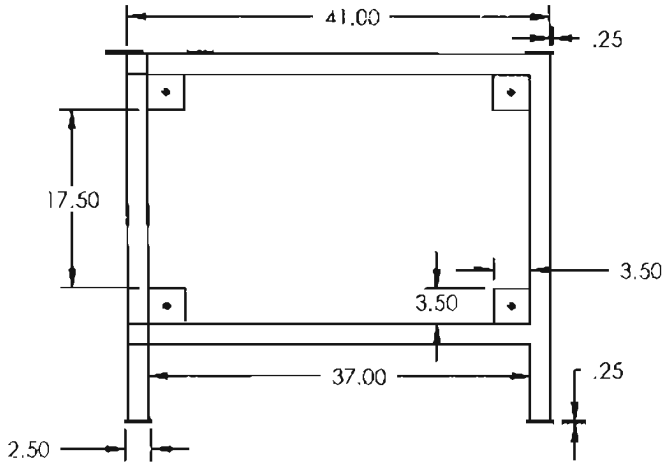
	(613) 226-1201 (613)-723-7301	
		FRECO FLUID POWER
13		TRL-50
		STEEL RESERVOIR
	D	TRL-50FAB A

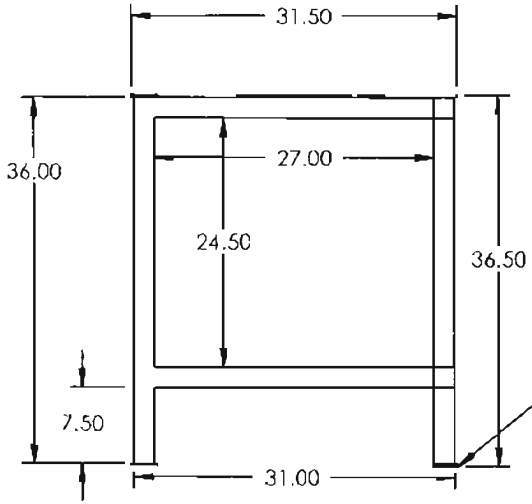


2.5" Square pads
1/4" overhang
1/4" thick
7 places

1/4-20 Tapped Hole
4 places







2.5" Square pads
1/4" overhang
1/4" thick
4 places

		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ± ANGULAR: MACH ± BEND ± TWO PLACE DECIMAL ± THREE PLACE DECIMAL ±	DRAWN	SGC	1/25/06
			CHECKED	JW	
			ENG APPR.	TBA	TBA
			MFG APPR.	TBA	TBA
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A		
		MATERIAL 2x2x3/16 Steel	COMMENTS:		
NEXT ASSY	USED ON	FINISH Smooth sharp edges			
APPLICATION		DO NOT SCALE DRAWING			

FRECO FLUID POWER Inc.

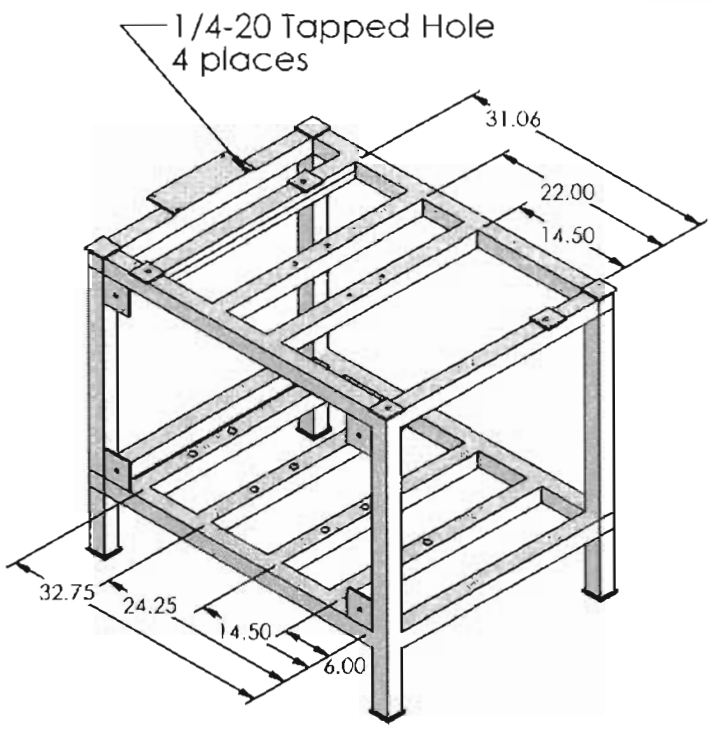
TITLE:

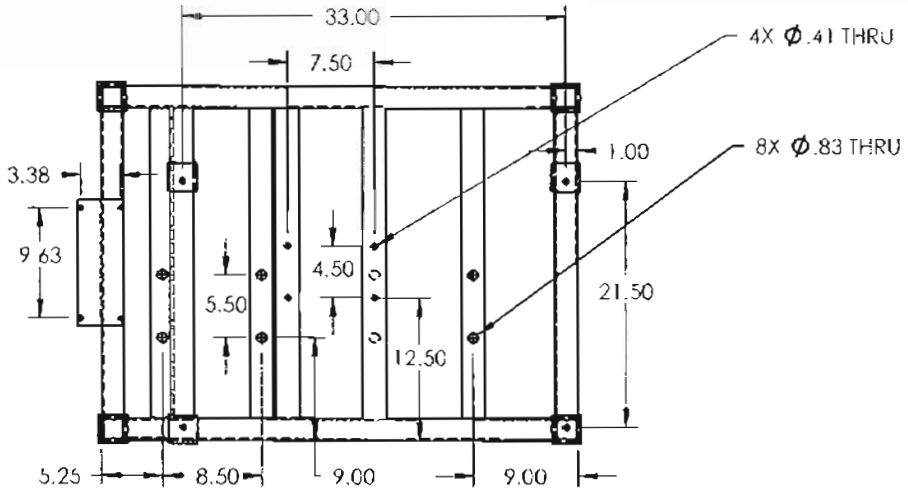
RESERVOIR STAND

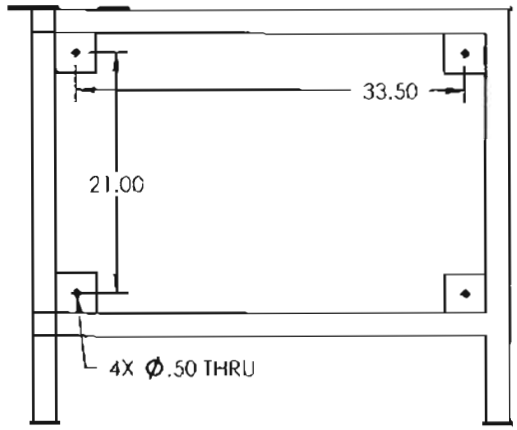
SIZE	DWG. NO.	REV
A	TWCS-50 Reservoir stand - Modified	A

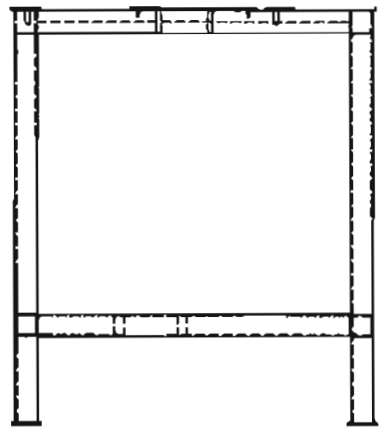
SCALE: 1:24 WEIGHT: ? SHEET 1 OF 2

5 4 3 2 1









		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES TOLERANCES FRACTIONAL ± ANGULAR: MACH ± BEND ± TWO PLACE DECIMAL ± THREE PLACE DECIMAL ±	DRAWN	SGC	1/25/06
			CHECKED	JW	
			ENG APPR	TBA	TBA
			MFG APPR	TBA	TBA
		INTERPRET GEOMETRIC TOLERANCING PER:	QA		
		MATERIAL: 2x2x3/16 Steel	COMMENTS		
NEXT ASSY	USED ON	FINISH: Smooth sharp edges			
APPLICATION		DO NOT SCALE DRAWING			

FRECO FLUID POWER Inc.

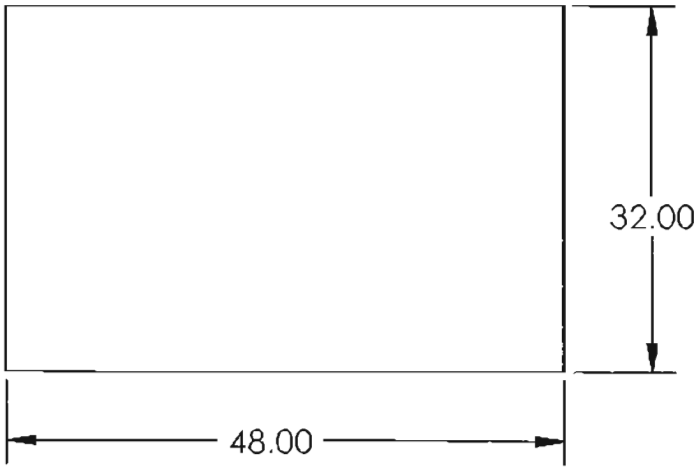
TITLE:

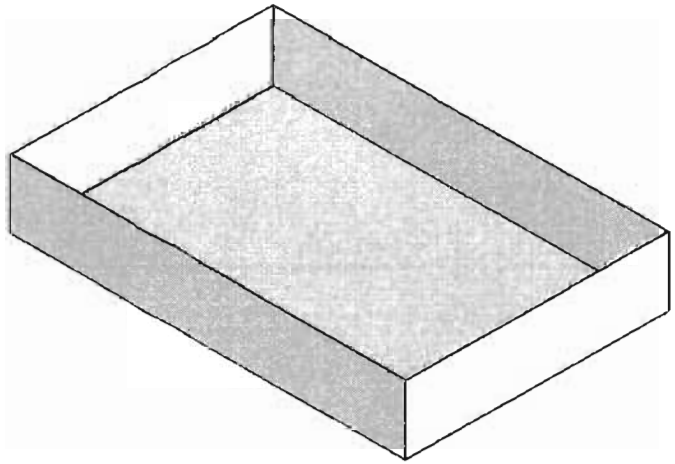
RESERVOIR STAND

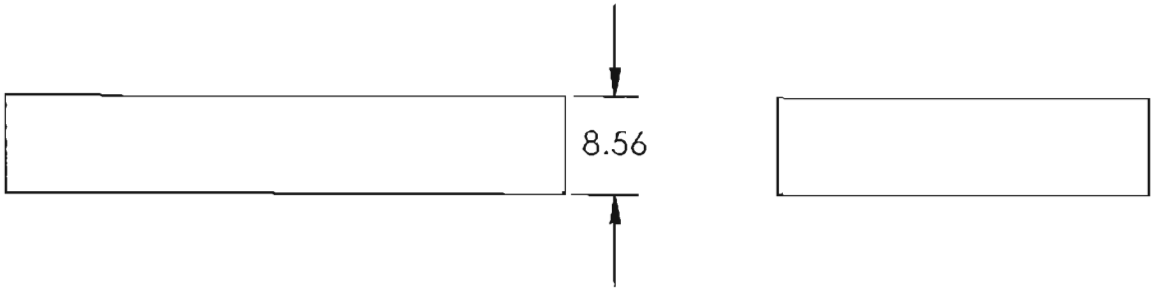
SIZE	DWG. NO.	REV
A	TWCS-50 Reservoir stand - Modified	A

SCALE: 1:16	WEIGHT: ?	SHEET 2 OF 2

5 4 3 2 1







		UNLESS OTHERWISE SPECIFIED		NAME	DATE
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ± ANGULAR: MACH ± BEND ± TWO PLACE DECIMAL ± THREE PLACE DECIMAL ±	DRAWN	SGC	1/25/06
			CHECKED	JW	1/25/06
			ENG APPR.	TBA	TBA
			MFG APPR	N/A	N/A
		INTERPRET GEOMETRIC TOLERANCING PER	Q.A.		
		MATERIAL 1/8" CRS	COMMENTS		
NEXT ASSY	USED ON	FINISH Smooth Sharp Edges			
APPLICATION		DO NOT SCALE DRAWING			

FRECO FLUID POWER INC.

TITLE:

55Gallon Drip Tray

SIZE	DWG. NO.	REV
A	Dr.Pan 55G 32x48x8.5	A

SCALE: 1:16	WEIGHT: TBA	SHEET 1 OF 1

5 4 3 2 1

SUCTION STRAINER
TFS SERIES
METAL END CAP

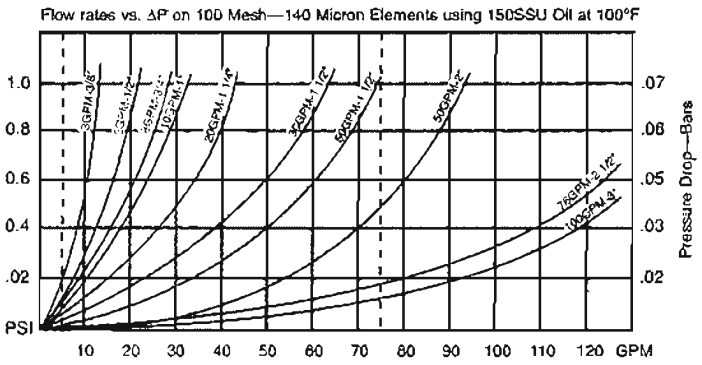
SPECIFICATIONS

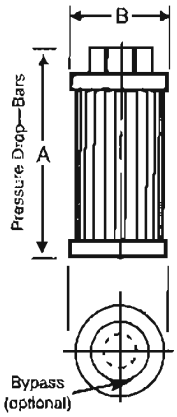
- Stainless Steel Mesh 140µ - 100 Mesh
- Temperature to 250°F (+120°C)
- Epoxy Bonded for Compatibility with Petroleum & Mineral Based Fluids.
- Aluminum End Caps

OPTIONS

- No By-pass or 3psi By-pass Available
- Custom Sizes on Request

TECHNICAL INFORMATION





DIMENSIONS / ORDERING INFORMATION

PART NO.	PORT	NOMINAL FLOW		FILTER AREA		LENGTH A		DIA. B		WT
METAL NO BY-PASS	(NPT)	GPM	L/MIN	IN²	CM²	in	mm	in	mm	(LB.)
TFS-040-0	3/8"	3	11	20	130	3.5	90	1.8	46	0.3
TFS-050-0	1/2"	5	19	25	161	4.2	107	1.8	46	0.4
TFS-070-0	3/4"	8	31	62	400	4.2	107	2.6	64	0.5
TFS-100-0	1"	10	38	110	710	5.5	140	2.6	64	0.7
TFS-120-0	1 1/4"	20	88	162	1050	5.5	174	3.4	86	1.0
tfs-150-0	1 1/2"	30	120	225	1450	5.5	225	3.4	86	1.2
TFS-1540-0	1 1/2"	50	198	340	2190	10.0	260	3.4	86	1.4
TFS-200-0	2"	50	198	340	2190	10.0	260	3.4	86	1.8
TFS-250-0	2 1/2"	75	283	400	2580	8.4	260	5.9	150	2.3
TFS-300-0	3"	100	379	500	3230	10.7	272	5.9	150	3.0
For Bypass Option Specify -3 (Eg. TFS-100-3)										

ACCESSORIES

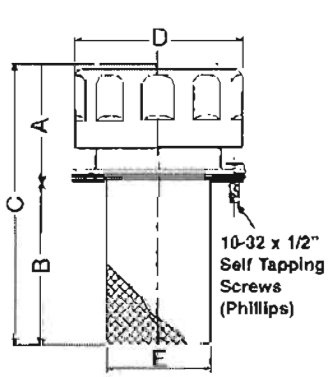
SPECIFICATIONS

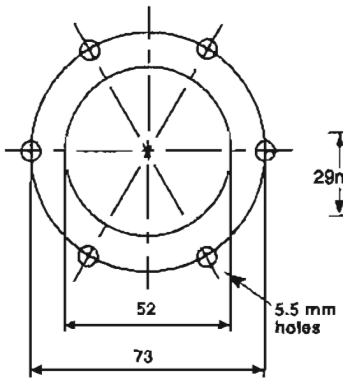
- Chrome Plated Metal Cap
- 30 Mesh Metal Basket
- Cork Gaskets
- Air Flow to 25cfm

OPTIONS

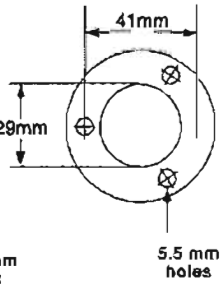
- Two Diameter Caps Available. 3.15" for SES3, 1.85" for SES6.
- 3µ, 10µ 40 Filtration Available on SES3 Version. 40µ Only on SES6 Version.
- 3, 6, and 8 inches Basket Length Available on SES3.
- Weatherproof Black Epoxy Coated Version Available.
- Special Versions Available on Request

DIMENSIONS



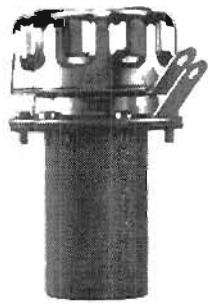


SES3



SES6

LOCKING VERSION



SES3L

PART NO.	MICRON RATING	AIR FLOW CAPACITY		OIL DISPLACEMENT		A		B		C		D		E		SCREWS
		cfm	m³/min	gpm	lpm	in	mm	in	mm	in	mm	in	mm	in	mm	
SES3-03	3	10.0	0.28	72	272	2.17	55	3.14	80	5.32	135	3.15	80	1.90	48	10-32x1/2
SES3-10	10	15.2	0.43	110	416	2.17	55	3.14	80	5.32	135	3.15	80	1.90	48	10-32x1/2
SES3-40	40	26.4	0.75	190	720	2.17	55	3.14	80	5.32	135	3.15	80	1.90	48	10-32x1/2
SES6-40	40	10.0	0.28	72	272	1.89	48	2.44	62	4.41	112	2.05	52	1.14	29	10-32x1/2

ORDERING INFORMATION

SES3	P	40	S80	D

PRODUCT TYPE	
SES3	Standard Air Breather Bayonet
SES6	Mini Air Breather Bayonet *
SLS3L	Lockable Breather

FILTRATION LEVEL	
03	3 Micron Paper
10	10 Micron Foam
40	40 Micron Foam

DIPSTICK	
D	Dipstick
Blank	No Dipstick

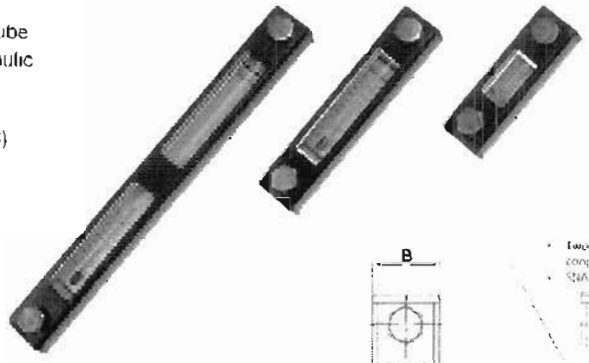
PLATING	
	Chrome
P	Weatherproof

BASKET LENGTH	
S80	Standard 80mm
S65	Mini Breather Basket (SES 6 only)
S150	Extended 150mm
S200	Extended 200mm

*Only 40µ available in SES 6 version.

Specifications

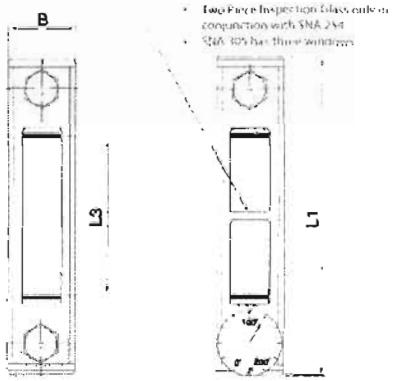
- Black Epoxy Coated Metal Shroud with Polyamid Sight Tube
- Suitable for Use with Mineral and Petroleum Based Hydraulic Fluids and Lubricants.
- Maximum Operating Temperature 194°F (90°C)
- Thermometer Calibration from -14°F (-10°C) to 176°F (80°C)
- SNA 076 has M10 Bolts as Standard
- SNA 127, SNA 254, SNA305 have M12 Bolts as Standard
- Tightening Torque 70 in/lb (7.9 Nm)



Options

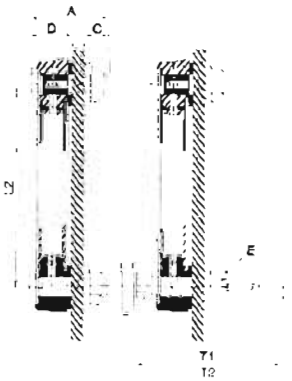
- Viton Seals
- Dial Thermometer Available with 7.9 in (200mm) or 11.8 in (300mm) Probe
- Other Special Seals Available upon Request
- Special Customized Scale Plates Available
- 1/2" UNC Bolts Available on SNA 127, 254 or 305
- M12 Bolts Available on SNA 076
- Special Lengths Available on Request
- Special plastic sight tubes available for improved UV resistance or special fluids

Please consult factory on the use of special fluids such as biological fluids, diesel oils, gasoline, etc.



Dimensions

	SNA 076		SNA 127		SNA 254		SNA 305	
	mm	in	mm	in	mm	in	mm	in
A	45	1.77	45	1.77	45	1.77	45	1.77
B	34.5	1.34	34.5	1.34	34.5	1.34	34.5	1.34
C	8MAX	0.32MAX	8MAX	0.32MAX	8MAX	0.32MAX	8	0.32
D	27	1.06	27	1.06	27	1.06	27	1.06
E	M10		M12		M12		M12	
L1	198	4.25	159	6.25	286	11.25	336	13.2
L2	76	3.00	127	5.00	254	10.00	305	12.0
L3	39	1.45	76	3.00	203	8.00	255	10.0
T1	200	7.88	200	7.88	200	7.88	200	7.88
T2	302	11.88	302	11.88	302	11.88	302	11.88



Ordering Information

SNA 127 B S T1 12 O60

Type

SNA

Series

076	SNA 076 (3")
127	SNA 127 (5")
254	SNA 254 (10")
305	SNA 305 (12")

Seal Material

B	BUNA NBR
V	VITON FPM

Design of Scale Plate

S	With Stauff-Logo (Standard)
N	No Logo
X	Custom Design

Thermo Switch (see page A28 for details)

OMIT	Without Thermo Switch
O60	TS-SNA/SNK-O-60
O70	TS-SNA/SNK-O-70
O80	TS-SNA/SNK-O-80

Banjo Bolts

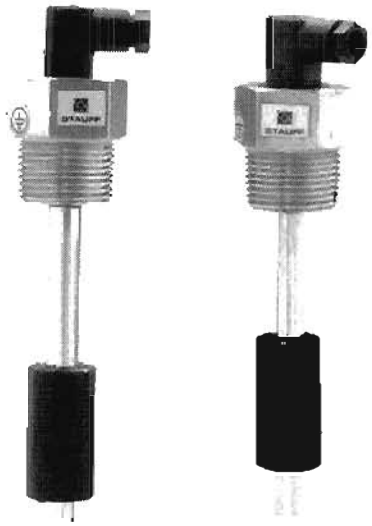
12	M 12 (Standard SNA 127, 254 & 305)
10	M 10 (Standard SNA 076)
U	1/2" UNC (Available for 127, 254 & 305)

Thermometer (Dial thermometer with probe T1/T2 for size M 12 and for 1/2" UNC /UNF)

O	Without Thermometer
T	Capillary Tube Thermometer on Scale Plate
T1	Dial Thermometer With 200 mm (7.9") Probe (7.9")
T2	Dial Thermometer With 300 mm (11.8") Probe (11.8")
T8	Blue Capillary Tube Option

General

The Stauff Level / Temperature Switches (SLTS-series) are unique in their design and modularity. One of the greatest advantages is the ability of the end-user to adjust the switching level. The internal support wire carrying the level and temperature switches makes it a simple and quick job to change the level switch position. See the drawings on the next page for the max and min level switch points and the total available switching range. This design permits changing the level switch function from Normally Closed (NC) to Normally Open (NO). Mentioned stem lengths are standard. Custom lengths are available upon request.



Contact Life Time

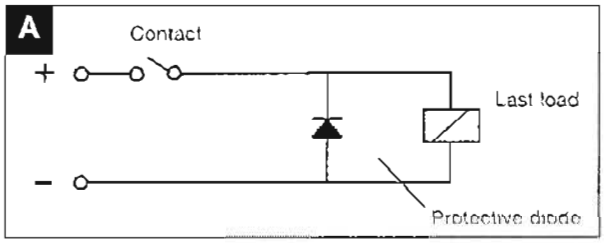
Due to their design Reed contacts have a very high life expectancy. However, it is worthwhile to note the following information.

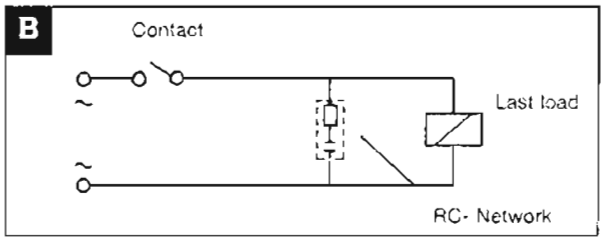
Contact protection

To reduce the high reverse voltage produced when a reed switch opens, the following contact protection can be applied.

a) DC voltage: a diode parallel to the load, see figure A

b) AC voltage: an RC-network parallel to the load, see figure B and table below.

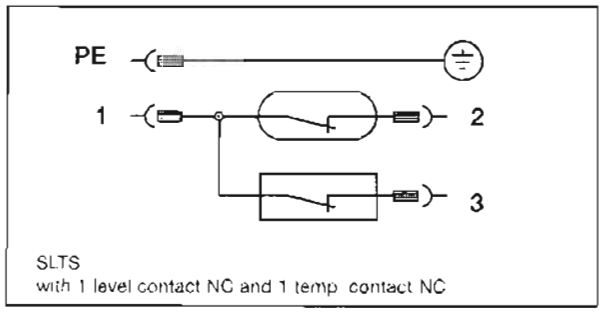




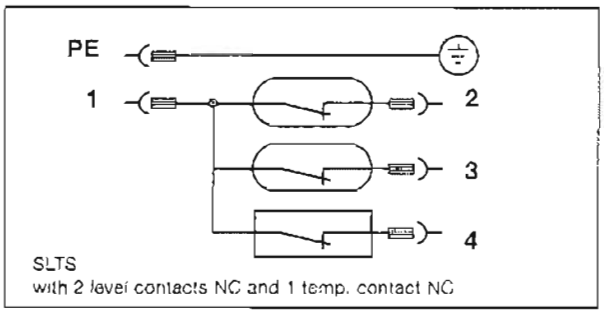
VA	10	25	50	75	100
Open contact voltage V	R/Ohm - C/µF	R/Ohm - C/µF	R/Ohm - C/µF	R/Ohm - C/µF	R/Ohm - C/µF
24	22 – 0,022	1 – 0,1	1 – 0,47	1 – 1	1 – 1
48	120 – 0,0047	22 – 0,022	1 – 0,1	1 – 0,47	1 – 0,47
110	470 – 0,001	120 – 0,0047	22 – 22	22 – 0,047	22 – 0,1

Wiring Diagram

Please refer to the following connection diagrams and the relevant data in the specification sheets.



SLTS
with 1 level contact NC and 1 temp. contact NC

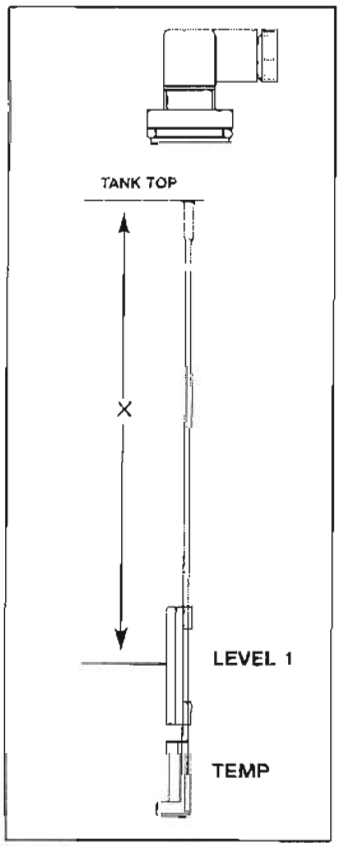


SLTS
with 2 level contacts NC and 1 temp. contact NC

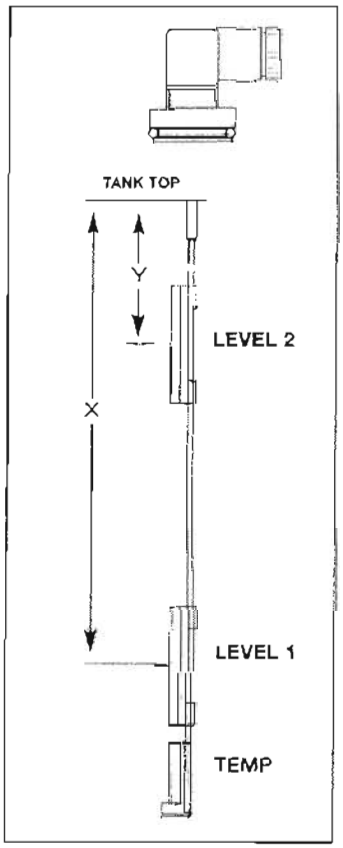
DIMENSIONS & ORDERING CODE

Standard Factory Settings For Level Switch Position			
	Option 1: Low Level Only (from tank top to switch position)	Option 2: High and Low Level (from tank top to switch position)	
SLTS Type	X (in / mm)	X (in / mm)	Y (in / mm)
SLTS 12	10.5 / 266	10.5 / 266	2.6 / 66
SLTS 18	16.5 / 418	16.5 / 418	2.6 / 66

Option 1



Option 2



Ordering Code

SLTS 12 - 140 - 2 - B12 - G115

Type

SLTS	Level-temperature switch

Stem Length

12	305 mm (12")
18	457 mm (18")

Switching temperature

140	60°C / 140°F
158	70°C / 158°F
0	without temperature switch

Voltage (Volt AC/DC)

G115	115 Volt max (for thread N16 only)

Thread

B12	G ¾ (on request)
N16	1 NPT (standard)

Number of Level Switches

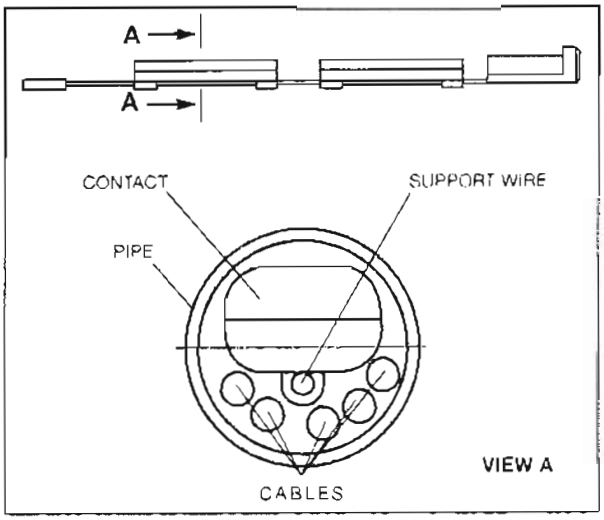
1	1 level switch (L, H)*
2	2 level switch (L, H)*

* please indicate level position(s): L = low, H = high

SPECIFICATIONS

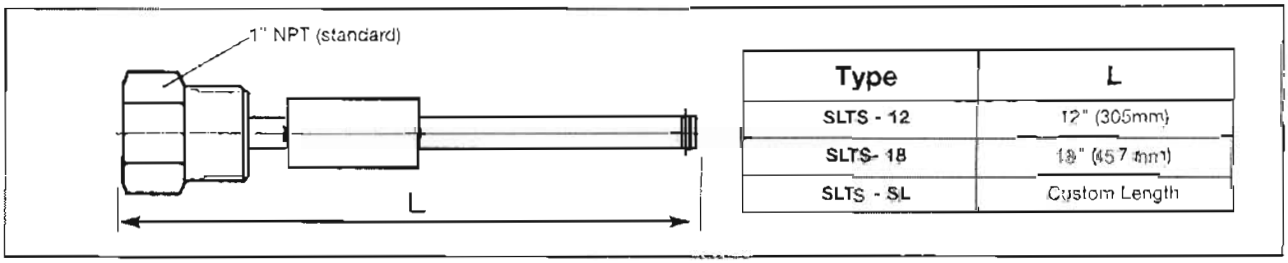
Specifications

- Brass Stem, Plastic float
- Compatible with mineral oils and petroleum based fluids
- Switches normally closed (NC)
- Max. operating temp 176°F
- Max. operating voltage 115V
- Max. current level contact 0.5A
- Max. current temp contact 2.0A
- Contact load level contact 10VA
- Hysterisis 18°F

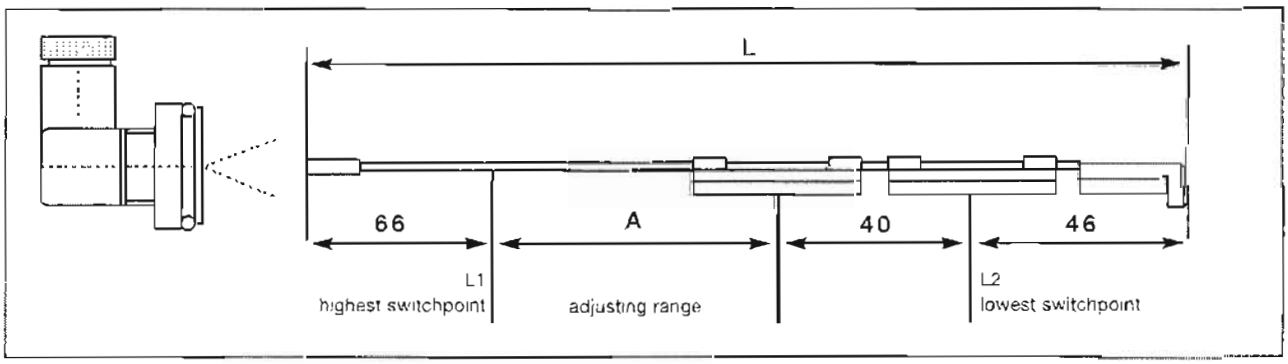


Options

- Any combination of three level temperature contacts
- Easy adjustable switch level
- Wide range of temperature switches
- Custom sizes, configuration and materials available upon request



Type	L
SLTS - 12	12" (305mm)
SLTS- 18	18" (457 mm)
SLTS - SL	Custom Length



Type	L	A
SLTS - 12	12.3" (312mm)	6.3" (160mm)
SLTS - 18	18.3" (464 mm)	12.3" (312 mm)
SLTS - SL	Custom Length	Custom Range

Parker Filtration

12AT/50AT Series

Spin-On Filters

Global Filtration Technology

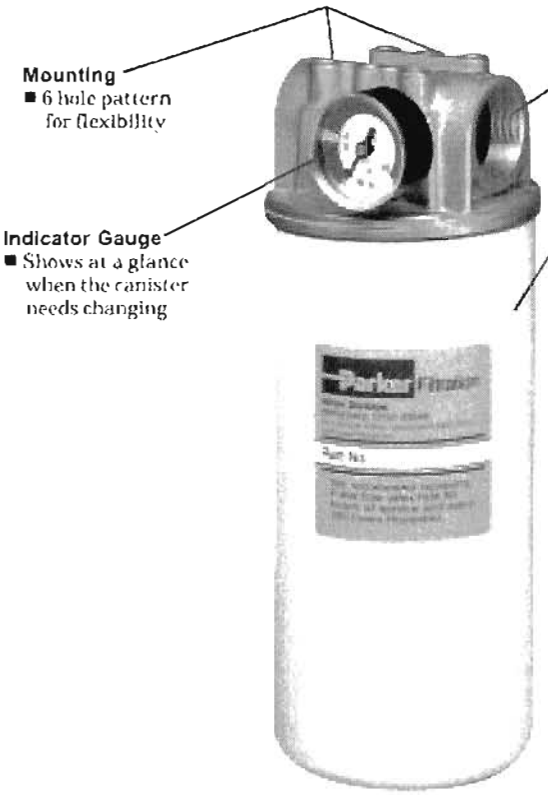
Spin-On Filters

12AT/50AT Series

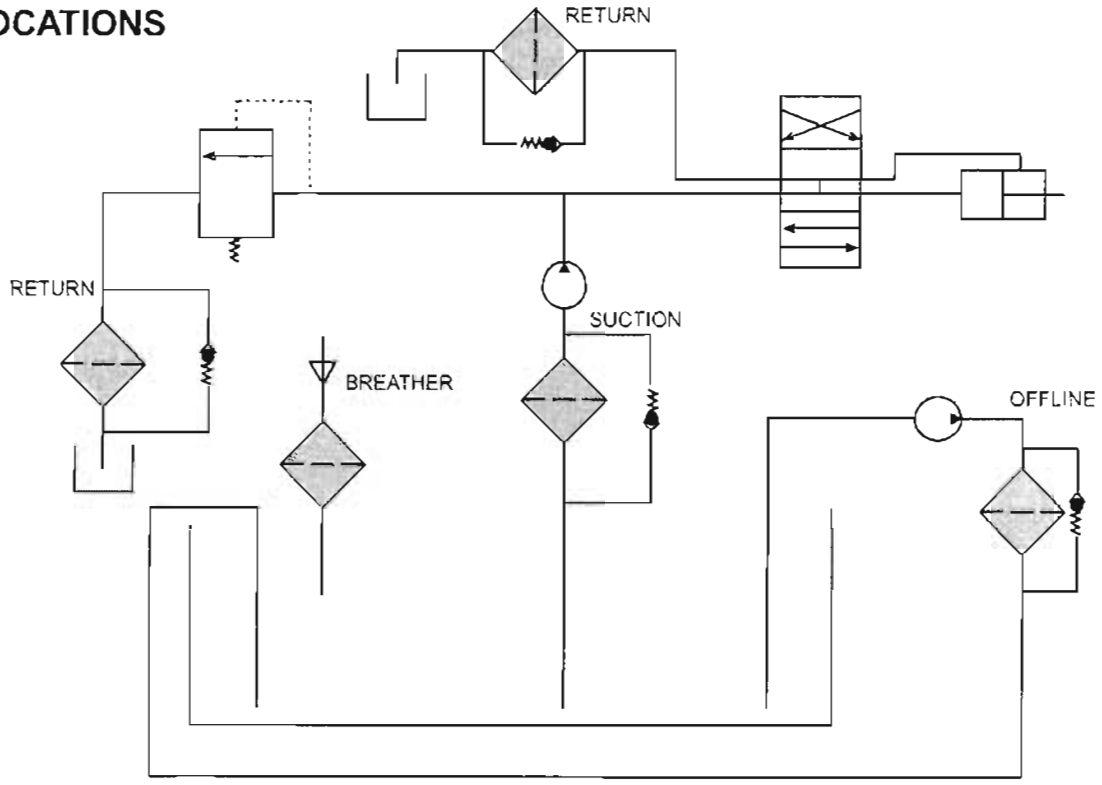
Applications for Spin-On Filters

- Mobile Equipment
- Hydrostatic Drives
- Industrial Power Units
- Reservoir Breathers

Often, economic conditions dictate what type of filter is used on a piece of equipment. When costs are tight, you need a filter that is inexpensive, yet uncompromising in performance and quality. Parker's spin-on filters fit that need. They are built to fit demanding design parameters in today's mobile and industrial equipment. No compromising.



TYPICAL LOCATIONS



Typical Element Performance: 12AT

Media Code	Filter Media	Beta Ratios	Particle Size / Efficiency
25C	Cellulose	$B_{25}=2$	25 / 50%
10C	Cellulose	$B_{10}=2$	10 / 50%
03C	Cellulose	$B_{3}=2$	3 / 50%
20B	Microglass	$B_{20}=75$	20 / 98.7%
10B	Microglass	$B_{10}=75$	10 / 98.7%

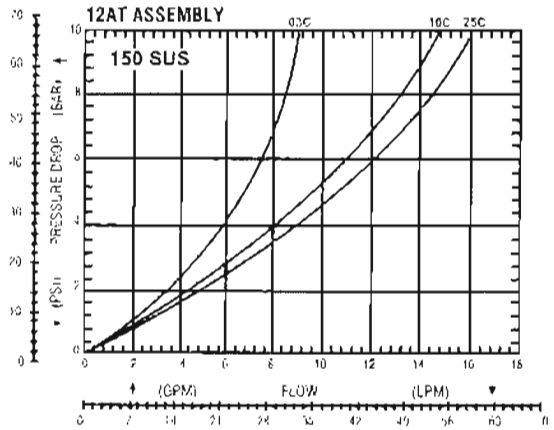
Actual results are dependent on system flow rates, fluid viscosities, and other parameters.

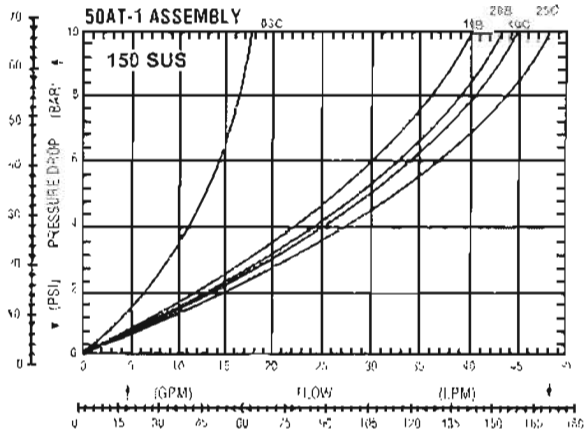
Typical Element Performance: 50AT

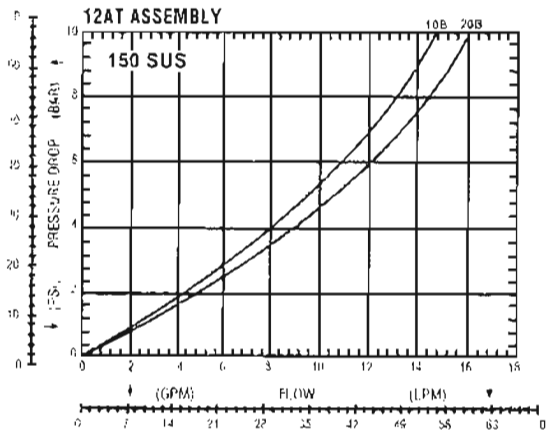
Media Code	Filter Media	Beta Ratios	Particle Size / Efficiency
25C	Cellulose	$B_{25}=2$	25 / 50%
10C	Cellulose	$B_{10}=2$	10 / 50%
03C	Cellulose	$B_{3}=2$	3 / 50%
20B	Microglass	$B_{20}=75$	20 / 98.7%
10B	Microglass	$B_{10}=75$	10 / 98.7%
10C-2	Cellulose	$B_{10}=2$	10 / 50%
20B-2	Microglass	$B_{20}=75$	20 / 98.7%
10B-2	Microglass	$B_{10}=75$	10 / 98.7%
03B-2	Microglass	$B_{3}=75$	3 / 98.7%

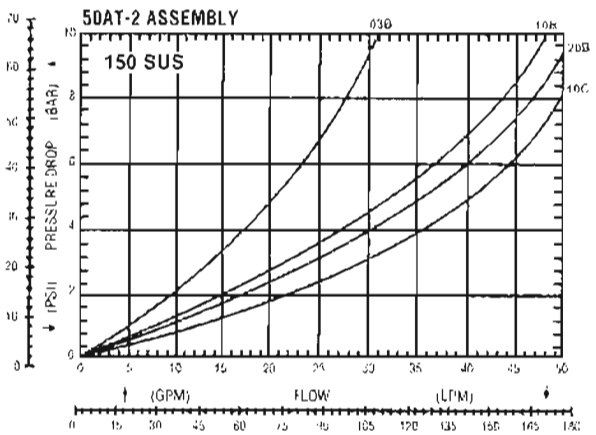
Actual results are dependent on system flow rates, fluid viscosities, and other parameters.

Beta Rating	Efficiency at (X) Particle Size
Bx = 2	50.0%
Bx = 20	95.0%
Bx = 75	98.7%
Bx = 200	99.5%
Bx = 1000	99.99%









Installation and Specification Data Model 50AT

Pressure Ratings:
Maximum Allowable Operating Pressure (MAOP): 150 psi (10.3 bar)

Design Safety Factor: 2.5:1

Operating Temperatures:
-40°F to 225°F (-40°C to 107°C)

Element Collapse Rating:
100 psid minimum

Element Condition Indicators:
Gauge: Color coded 15/25 psi

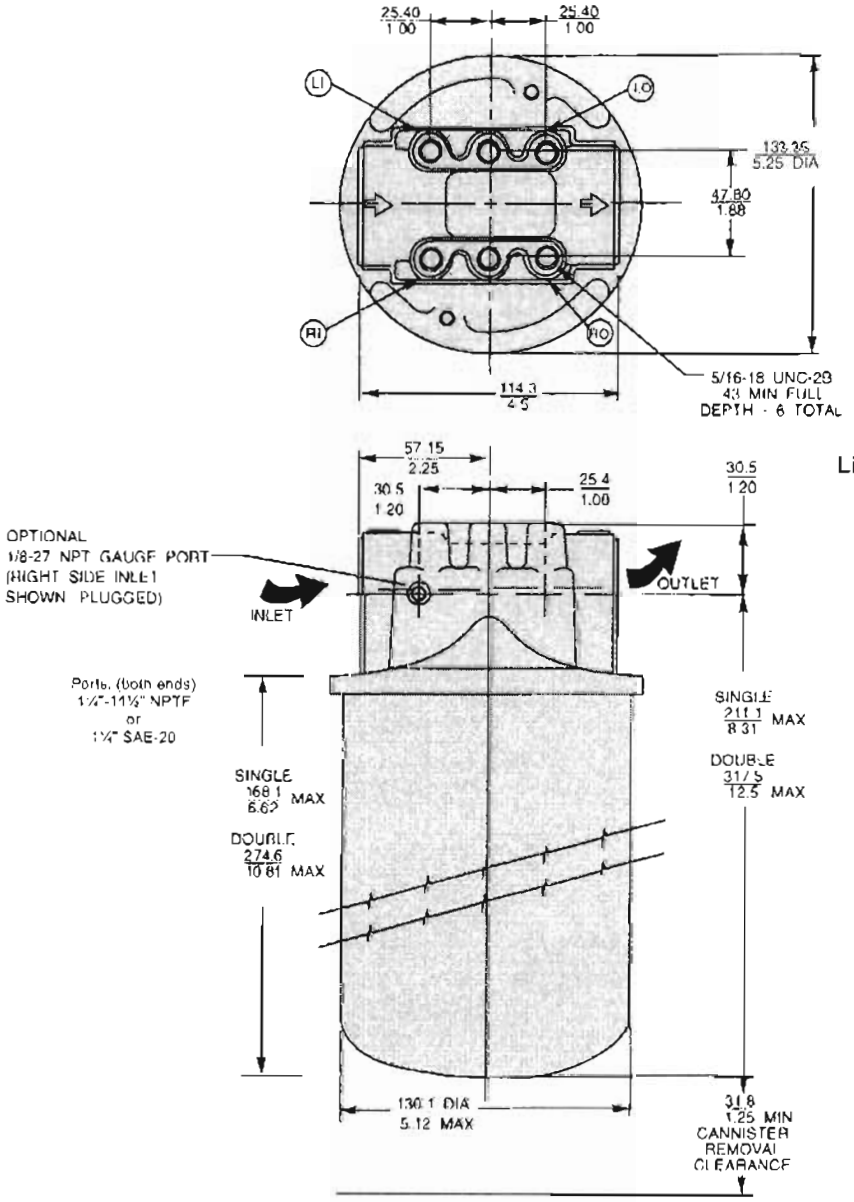
Pressure Switch: Normally open
20 +/- 2 psi
5 Amps @ 24 VDC

Vacuum Switch: Normally open
5" +/- 1" Hg
1.0 Amp @ 120 VAC

Filter Material:
Head: Aluminum
Canister: Low Carbon Steel

Shipping Weights (approximate):
Single length: 3.7 lbs.
Double length: 5.3 lbs.

Optional Gauge Port Locations:
RI - Right side of inlet
LI - Left side of inlet
RO - Right side of outlet
LO - Left side of outlet



Linear Measure: millimeter / inch

Filter Service

Filter canisters need to be replaced when the pressure gauge reads the filter bypass setting. For example, if a 12AT filter has a 25 psi bypass valve, it needs to be replaced when the pressure gauge reads 25 psi. If no indicator of any kind is used, replace the canister after the first 50 hours of operation, and every 250 hours thereafter. More frequent replacement could be required depending on operating conditions.

When servicing a 12AT or 50AT filter, use the following procedure:

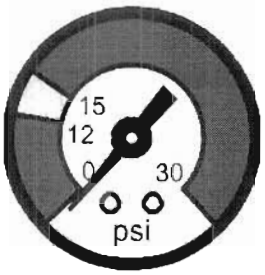
A. Shut down the main system and release pressure in the filter line.
B. Unthread the canister and discard it along with the accompanying seal. A strap wrench may be required.
C. Apply a small amount of lubricant to the new canister seal.
D. Install the new canister and hand tighten.

Accessory Parts List

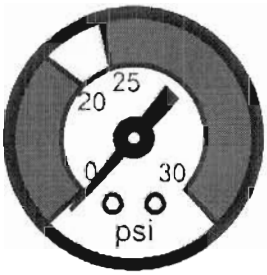
Description	12AT	50AT
Gauge - 15 psi	934238	934238
Gauge - 25 psi	934237	934237
Pressure switch-25 psi	926923	926923
Vacuum switch	926949	926949
Breather adaptor kit	926876	926875
Vacuum gauge	934239	934239

Replacement Canisters

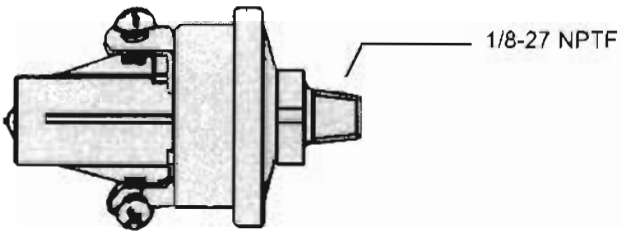
Media	12AT	50AT	50AT-2
25C	925023	926170	N/A
10C	921999	926169	927736
03C	926543	926541	N/A
20B	928764	928767	929446
10B	928763	928766	929445
03B	N/A	934200	932073



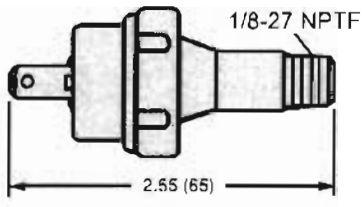
Indicator Gauge (15 PSI)



Indicator Gauge (25 PSI)



VACUUM SWITCH

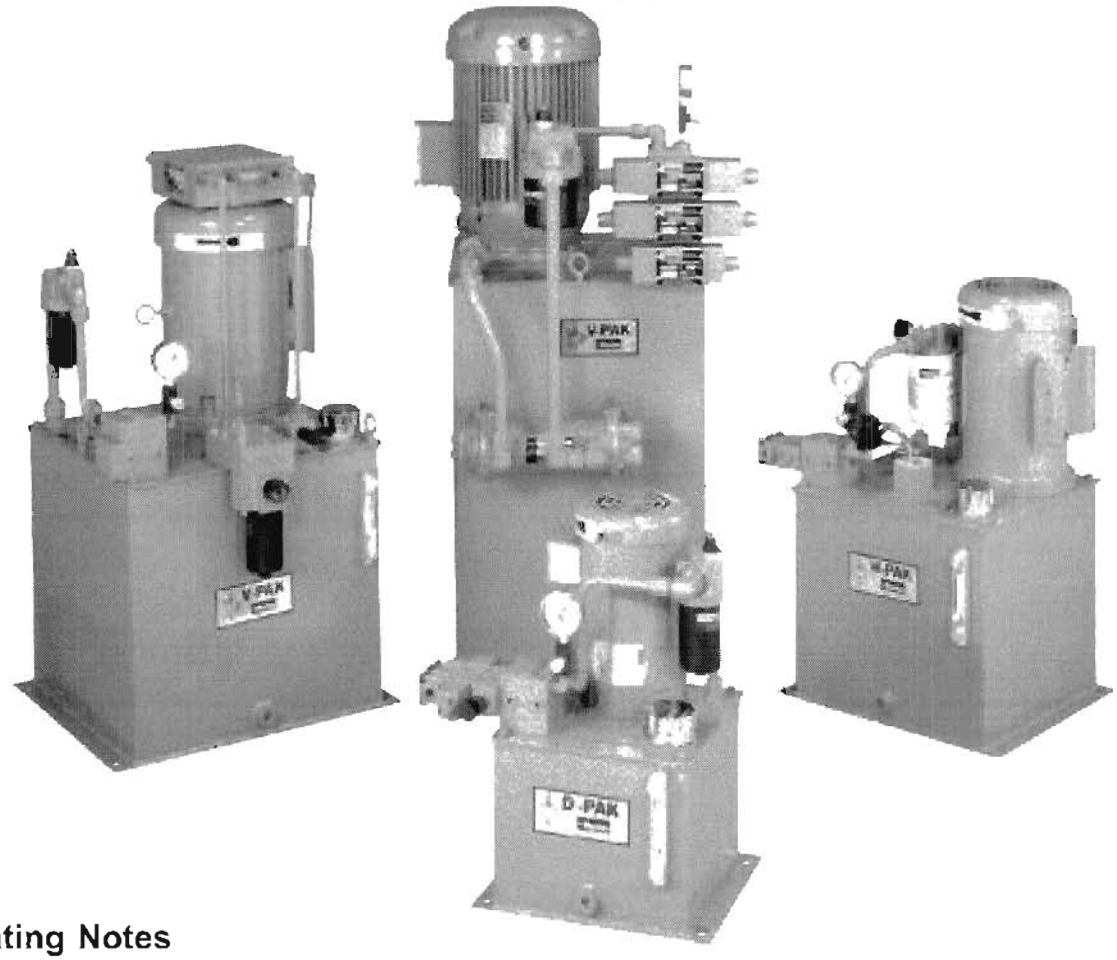


PRESSURE SWITCH

77 Auriga Drive, Unit 9
Nepean, Ont. K2E 7Z7
Tel : (613) 226-1201
Fax : (613) 723-7391

Start Up Information

Parker Hydraulics



Operating Notes

- Jog the electric motor once and verify that the electric motor is rotating in the same direction as the arrow on the electric motor housing. If direction is incorrect, reverse two of the three leads on a 3 phase electric motor.
- D & H-Pak power units are tested and relief valve is set at maximum pressure of the pump/motor combination.
- V Pak power units are tested and pressure control valves are factory preset. If adjustments are needed, follow the procedure below: Begin adjusting relief valve and pump compensator control valve to increase pressure gradually. (**NOTE:** Always set relief valve 250 PSI higher than pump compensator pressure control valve or severe overheating will occur.)
- If pump fails to prime, vent pump discharge to atmosphere to establish fluid flow.
- Reservoir temperature should not exceed 150°F. System reliability and component service life will be reduced when system is operated at higher temperature.
- Clean fluid = improved system reliability and longer component service life, change filter elements whenever filter indicators indicate a dirty element condition.
- It is recommended that every 4,000 operating hours or once a year, whichever occurs first, the filler/ breather cap and suction strainer should be replaced.

Fluid Recommendations

Premium quality hydraulic oil with a viscosity range between 150-250 SSU (30-50 cst.) at 100°F (38°C). Normal operating viscosity range between 80-1000 SSU (17-180 cst.). Maximum start up viscosity is 4000 SSU (1000 cst.)

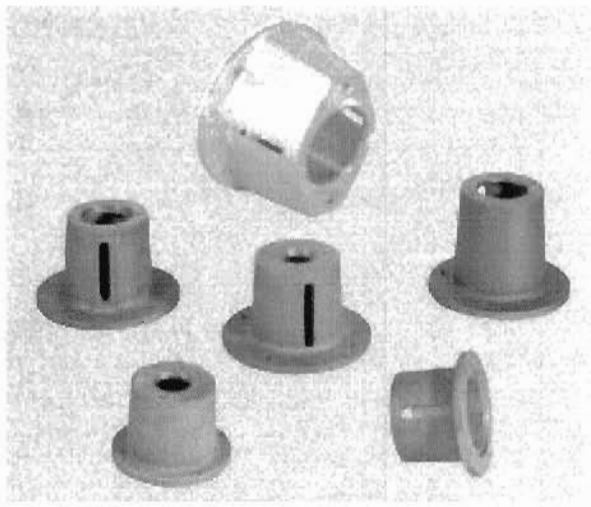
NOTE: Consult Parker when exceeding 160°F (71°C) operation. Oil should have maximum anti-wear properties, rust and oxidation treatment.

Filtration

For maximum pump and system component life, the system should be protected from contamination at a level not to exceed 125 particles greater than 10 microns per milliliter of fluid. (SAE Class 4 / ISO 16/13.) Due to the nature of variable displacement pumps, variations in pump inlet conditions, fluid acceleration losses, system aeration, and duty cycle must be carefully considered before specifying suction line filtration. Contact your Parker representative for assistance.

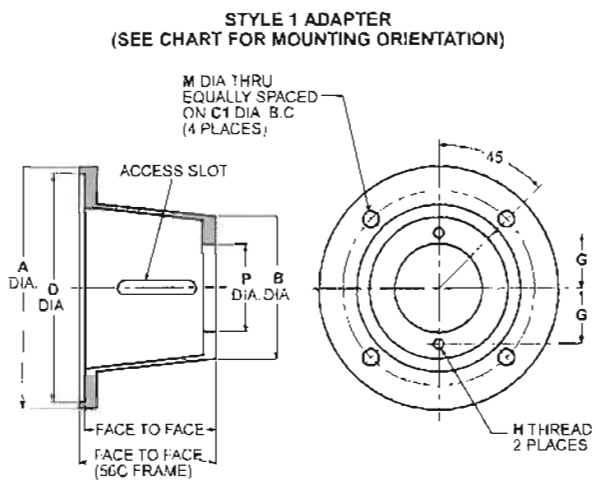
NOTE: For additional information refer to Bulletin No. IG-2600-550-001M1

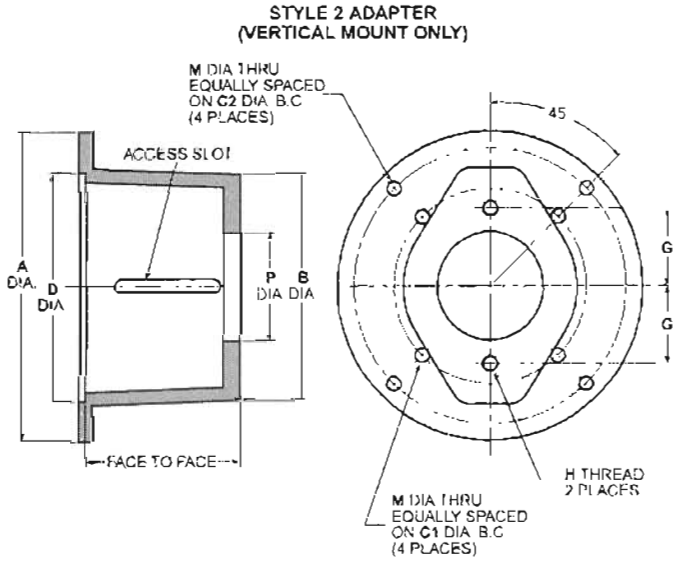
The totally enclosed pump mounting bracket offers precision shaft alignment and safety from the rotating shafts and coupling. The bracket is designed to mount on the motor face with the motor coupling half secure to the shaft. Then the pump, with its coupling half secure on the pump shaft, is mounted and the coupling halves are engaged. This will require proper spacing of the coupling prior to installation and a coupling with an outside diameter less than "P" dimension. If the coupling selected cannot be assembled this way, both coupling halves must be installed on the motor shaft. Next, mount the adapter on the motor. Then the pump can be mounted and the coupling secured to the pump by using the access slot to tighten the pump shaft coupling set screw.



Dimensions*

Pump Mounting Adapter





Model Number	Pump Mounting	Motor Mounting	A	B	C1	C2	D	Face to Face	G	H	M	P	Vertical Mounting	Horizontal Mounting	Style	Weight
876631	SAE AA	56C	6.7	5.0	5.88	N/A	4.50	3.50	1.63	3/8-16	0.44	2.00	YES	YES	1	3 lb
876632	SAE AA	182TC/256TC	9.0	5.3	7.25	N/A	8.50	5.00	1.63	3/8-16	0.56	2.00	YES	YES	1	4 lb.
876633	SAE A	56C	6.7	5.0	5.88	N/A	4.50	4.25	2.10	3/8-16	0.44	3.25	YES	YES	1	4 lb
876634	SAE A	182TC/256TC	9.0	5.3	7.25	N/A	8.50	5.00	2.10	3/8-16	0.56	3.25	YES	YES	1	4 lb
876635	SAE A	182TC/256TC	9.0	5.3	7.25	N/A	8.50	5.88	2.10	3/8-16	0.56	3.25	YES	YES	1	5 lb.
875343	SAE B	182TC/256TC	11.4	9.0	7.25	10.25	8.50	5.75	2.88	1/2-13	0.53	4.00	YES	NO	2	7 lb.
875344	SAE B	182TC/256TC	11.4	9.0	7.25	10.25	8.50	6.81	2.88	1/2-13	0.53	4.00	YES	NO	2	8 lb
876683	SAE B	182TC/256TC	9.0	8.8	7.25	N/A	8.50	6.38	2.88	1/2-13	0.53	4.00	NO	YES	1	7 lb.
876684	SAE C	182TC/256TC	9.0	9.3	7.25	N/A	8.50	6.69	3.56	5/8-11	0.53	5.00	NO	YES	1	20 lb.

* All dimensions are in inches.

NOTE It is the responsibility of the user to check the listed dimensions to ensure suitability of mounting adapter with pump/coupling/motor combination

Application Formulas

- 1 GPM at 1500 PSI = 1 HP (General Rule)
- 1 Gallon = 231 Cubic Inches (3.7854 Liters)
- 1 Gallon Oil = 7.08 Lbs.
- 1 bar = 14.5 PSI
- 25.4mm = 1 Inch
- 1 HP = 42.4 BTU/Min
- 1 Gallon = 3.7854 Liters

$$HP = \frac{GPM \times PSI}{1714 \times Pump\ Efficiency}$$

$$PSI = \frac{1714 \times Pump\ Efficiency \times HP}{GPM}$$

$$GPM = \frac{1714 \times Pump\ Efficiency \times HP}{PSI}$$

$$HP = \frac{Torque\ (in.\text{-}lbs.) \times RPM}{63025}$$

$$Torque = \frac{HP \times 63025}{RPM}$$

$$RPM = \frac{HP \times 63025}{Torque}$$

Motor Information

At 440V — 3-Phase Motor Draws 1.25 AMP/HP
At 220V — 3-Phase Motor Draws 2.5 AMP/HP
At 110V — Single Phase Motor Draws 10 AMP/HP

FRECO
FLUID
POWER

77 Auriga Drive, Unit 9
Nepean, Ont. K2E 7Z7
Tel : (613) 226-1201
Fax : (613) 723-7391

Valve Information

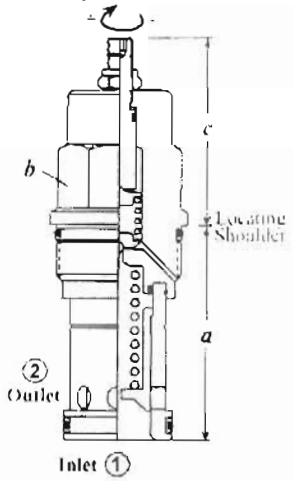
Parker Hydraulics

PILOT OPERATED

Capacity	Typical Cartridge Model Code	Cavity	Cartridge Dimensions a	b	c L	c C	c K	Installation Torque (lb. ft.)
[illegible]	RPCC – LAN	T - 162A	1.22	3/4"	2.11	2.17	2.31	25/30
[illegible]	RPEC – LAN	T - 10A	1.56	7/8"	2.00	2.06	2.25	30/35
[illegible]	RPGC – LAN	T - 3A	1.88	1 1/8"	2.12	2.18	2.38	45/50
[illegible]	RPIC – LAN	T - 16A	2.44	1 1/4"	2.44	2.47	2.69	150/160
[illegible]	RPKC – LAN	T - 18A	3.13	1 5/8"	2.81	2.94	3.06	350/375

OPTION ORDERING INFORMATION

Full Adjustment 5 Turns



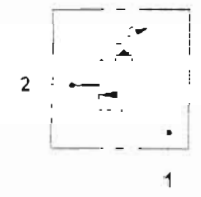
RP * C – * * *

Nominal Capacity	Control**	Adjustment Range	Seal
C [illegible] GPM	L Standard Screw	A 100 - 3000 psi	N Buna-N
E [illegible] GPM	C Jumper Resistant	B 50 - 1500 psi	V Viton
G [illegible] GPM	K Handknob	C 150 - 6000 psi	
I [illegible] GPM		N 60 - 800 psi	
K 200 GPM		Q 60 - 400 psi	
		W 150 - 4500 psi	

Adjustment Range Options
A, B, C, and W are standard set at 1000 psi
N Option is standard set at 400 psi.
Q Option is standard set at 200 psi
** Minimum setting 75 psi on all ranges.*
Customer may specify pressure setting.

** *See page 92 for information on Control Options*

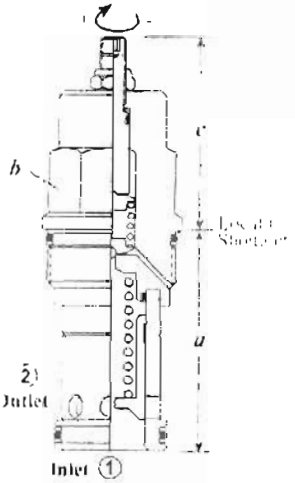
PILOT OPERATED, RAPID RESPONSE



Capacity	Typical Cartridge Model Code	Cavity	Cartridge Dimensions a	b	c L	c C	c K	Installation Torque (lb. ft.)
25 GPM	RPEE – LAN	T - 10A	1.56	7/8"	2.00	2.06	2.25	30/35
50 GPM	RPGE – LAN	T - 3A	1.88	1 1/8"	2.12	2.18	2.25	45/50
100 GPM	RPIE – LAN	T - 16A	2.44	1 1/4"	2.44	2.47	2.69	150/160
200 GPM	RPKE – LAN	T - 18A	3.13	1 5/8"	2.81	2.94	3.06	350/375

OPTION ORDERING INFORMATION

Full Adjustment 5 Turns



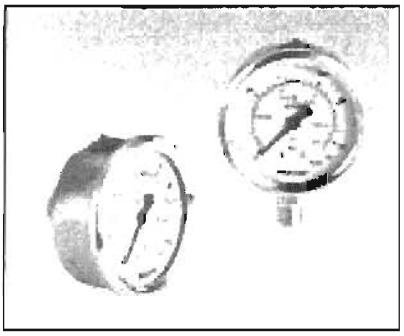
RP * E – * * *

Nominal Capacity	Control**	Adjustment Range	Seal
E [illegible] GPM	L Standard Screw	A 100 - 3000 psi	N Buna N
3 [illegible]	C Jumper Resistant	B 50 - 1500 psi	V Viton
I [illegible]	K Handknob	C 150 - 6000 psi	
K [illegible]		D 25 - 800 psi	
		E 25 - 400 psi	
		W 150 - 4500 psi	

Adjustment Range Options
A, B, C and W are standard set at 1000 psi
D Option is standard set at 400 psi
E Option is standard set at 200 psi
Customer may specify pressure setting.

** *See page 92 for information on Control Options*

Pressure Gauges **SPG**



Area of Application: mechanical pressure measurement

Characteristics:
- suitable for hydraulic oil and gaseous media that do not attack any copper base alloy
- available in nominal sizes 63 and 100
- standard thread form: BSP
- housing made out of stainless steel (1.4301)
- sight glass made out of acrylic
- glycerine filled
- standard dual scales with pressure indication in bar and PSI
- U-bolt or flange mounting kit on request

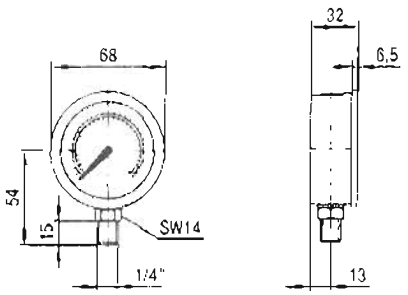
Please consult our office before you use SPG with other media.

Technical Data:

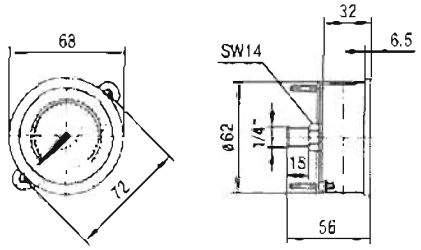
System of protection:	IP 65 (EN 60 529 / IEC 529)
Accuracy class SPG-063:	1.6 (±1.6 % FS as per EN 837-1)
Accuracy class SPG-100:	1.0 (±1.0 % FS as per EN 837-1)
environmental temp. range:	-20°C ... +60°C
temperature range medium:	max +60°C

Options (on request):
- additional scale readings including personilisation
- thread form NPT
- U-bolt and flange mounting kits are available separately as spare parts
- additional pressure ranges up to 1.000 bar max

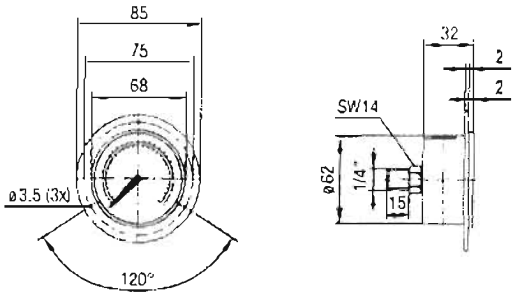
Dimensions SPG 063



SPG 063

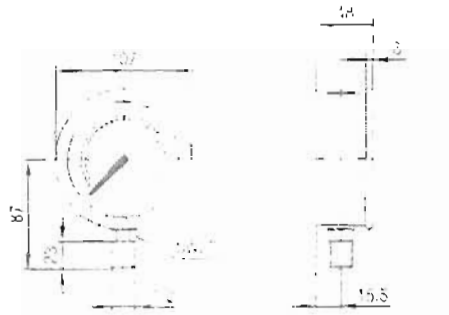


SPG 063 ... U

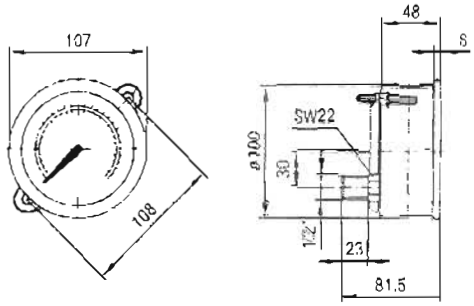


SPG 063 ... F

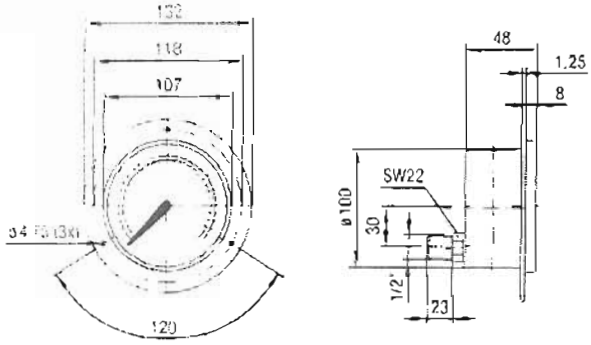
Dimensions SPG 100



SPG 100



SPG 100 ... U



SPG 100 ... F

Ordering Code

SPG 063 - 0-160 - 1 - R - B - U

Type	
SPG	Stainless steel pressure gauge

Size	
063	63 mm with G¼ or ¼ NPT connection
100	100 mm with G½ or ½ NPT connection

Pressure range	
-1 – 1,5	-1 – 1,5 bar -21 PSI
-1 – 3	-1 – 3 bar -15 PSI
0 – 10	0 – 10 bar 150 PSI
0 – 16	0 – 16 bar 230 PSI
0 – 25	0 – 25 bar 360 PSI
0 – 40	0 – 40 bar 580 PSI
0 – 60	0 – 60 bar 850 PSI
0 – 100	0 – 100 bar 1450 PSI
0 – 160	0 – 160 bar 2300 PSI
0 – 250	0 – 250 bar 3600 PSI
0 – 400	0 – 400 bar 5800 PSI
0 – 600	0 – 600 bar 8700 PSI
0 – 680	0 – 680 bar 10 000 PSI
0 – 700	0 – 700 bar 10 000 PSI
0 – 1000	0 – 1000 bar 14 500 PSI

Accessories (for rear entry only)	
(none)	no accessory
U	U-bolt assembly
F	Front flange assembly

Thread size	
B	BSP (G¼ or G½) (standard)
N	NPT (¼ NPT or ½ NPT) (only on request)

Adaption	
S	Stem mounting
R	Rear mounting

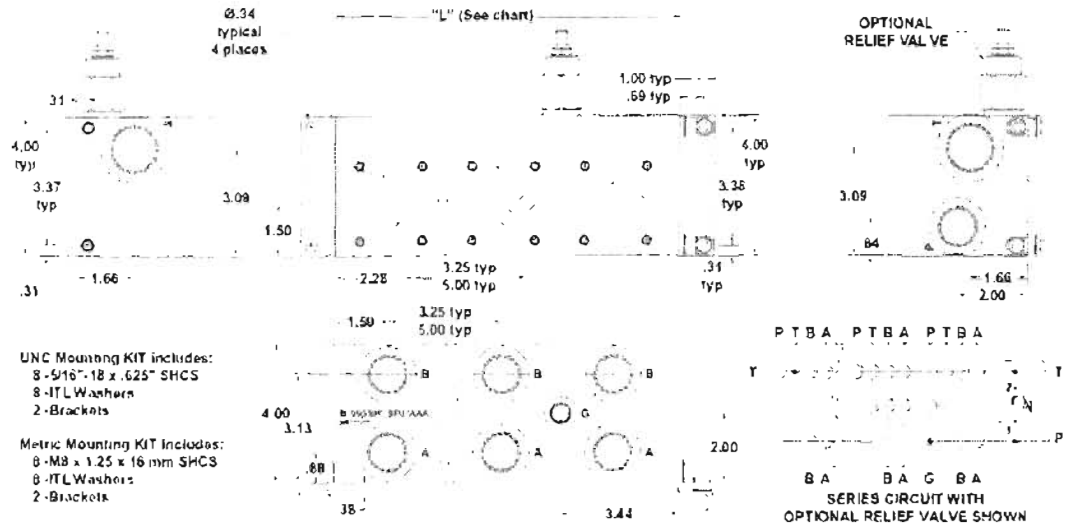
Style of scales	
1	BAR/PSI (bar outside / PSI inside)

Lynch Manifolds & Valve Packs

02/2002 A Rev. 06/2002 **1.03.10**

D05 High Flow Series Circuit Manifold

Click here for Relief Valves



No. of Stations	2	3	4	5	6
Dim. "L" 3.25" spacing	6.75	10.00	13.25	16.50	19.75
est. weight in lb. - alum	10	15	20	25	30
est. weight in lb. - iron	27	40	52	65	78
Dim. "L" 5.00" spacing	8.50	13.50	18.50	23.50	28.50
est. weight in lb. - alum	13	20	27	35	42
est. weight in lb. - iron	34	53	73	92	112

SHADED AREA AVAILABLE ON SPECIAL ORDER ONLY

NOTES: 1) FOR PILOT PORT OPTIONS SEE D05 BAR MANIFOLD ADAPTER SHEETS ON PAGES 1.03.11 & 1.03.12

2) P-T MAIN SYSTEM RELIEF AVAILABLE AS A STANDARD OPTION

PART NUMBER SYSTEM

Aluminum D05 with 3.25" spacing and SAE porting example: BA05G3H**SFUAAAA

TYPE	MATERIAL	VALVE PATTERN	CIRCUIT, CAPACITY & SPACING	Std. NO. of STATIONS	PORT CODE	MOUNTING THREADS & KIT	RELIEF CAVITY

TYPE
- B — Bar Manifold

MATERIAL
- A — Aluminum
- D — Ductile Iron

VALVE PATTERN
- 05G — ISO 4401-05-04 NFPA T3.5.1 D05

CIRCUIT, CAPACITY & SPACING
- SH — Series circuit, High Flow, 3.25" Std. Spacing
- SI — Series circuit, High Flow, 5.00" Wide Spacing

Std. NO. of STATIONS
- 02 to 04

PORT CODE

CODE	TYPE	T	P A & B	G
SF	SAE	16	12	6
NF	NPTF	1"	3/4"	1/4"
BF	BSPP	1"	3/4"	1/4"
TF	BSPT	1"	3/4"	1/4"
MF	METRIC	M33	M27	M10

MOUNTING THREADS & KIT

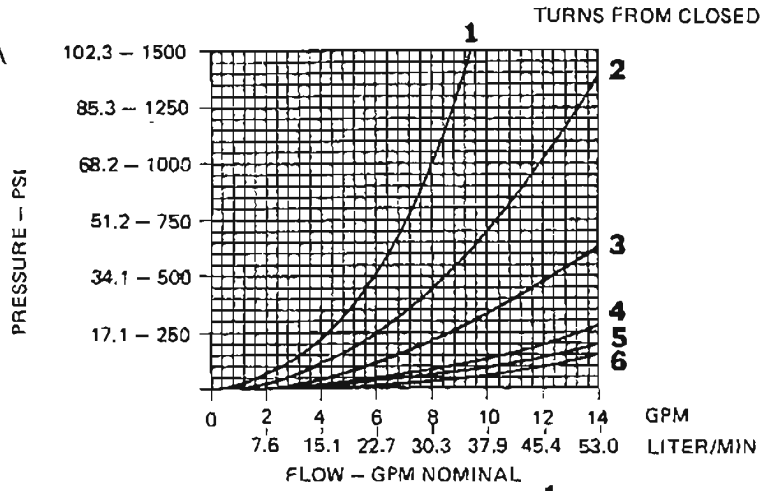
U	UNC Std for SAE & NPT	D05 Valve Manifold	1/4"-20 UNC x .75 dp 5/16"-18 UNC x .47 dp
M	Metric Std for BSPP & Metric	D05 Valve Manifold	M6 x 1.00 x .75 dp M8 x 1.25 x .47 dp

RELIEF CAVITY
- AAAA — None
- EAAA — Std T3A
- DAAA — Common C10-2

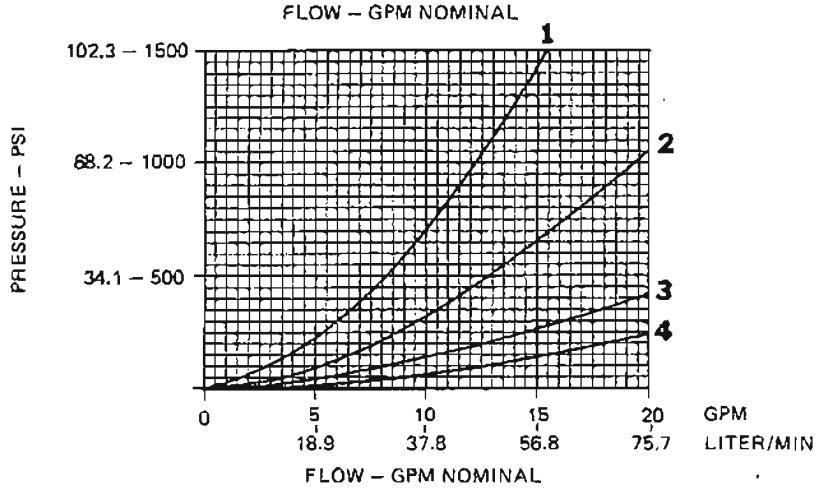
Technical Information

ENGINEERING PERFORMANCE DATA

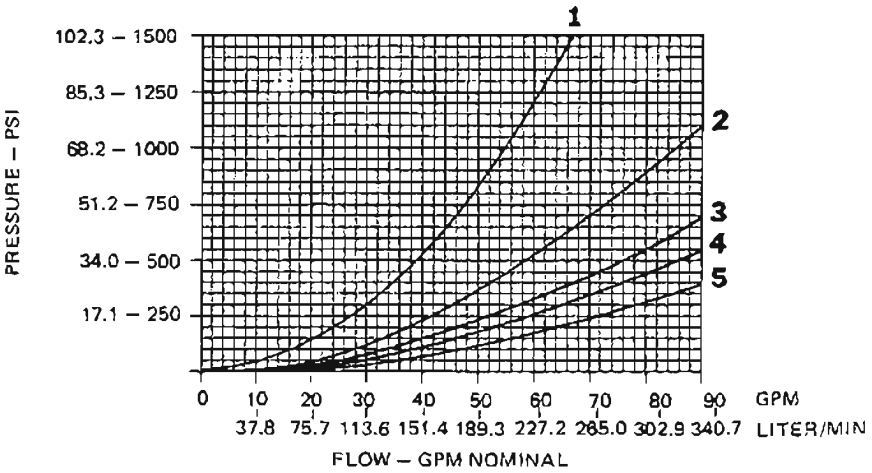
FM2 – STANDARD NEEDLE



FM3 – STANDARD NEEDLE



FM6 – STANDARD NEEDLE



Curves were generated using 100 SSU hydraulic oil. For any other viscosity, pressure drop will change as per chart.

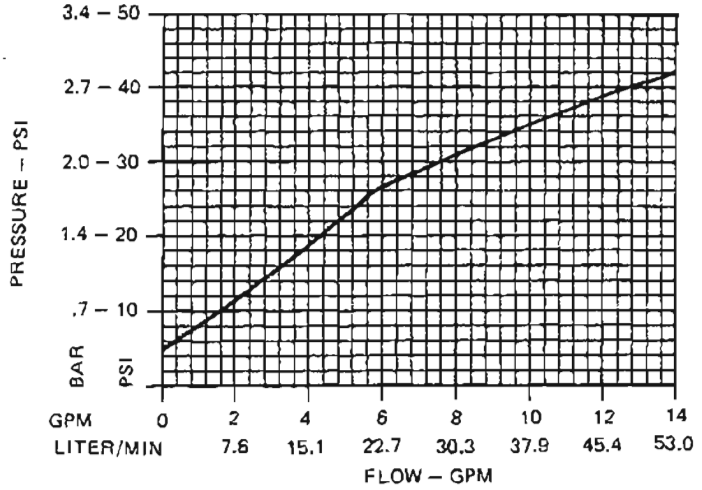
VISCOSITY CORRECTION FACTOR							
Viscosity (SSU)	75	150	200	250	300	350	400
Percentage of Δ P (Approx.)	93	111	119	126	132	137	141

For additional information – call your local Parker Fluidpower Motion & Control Distributor.

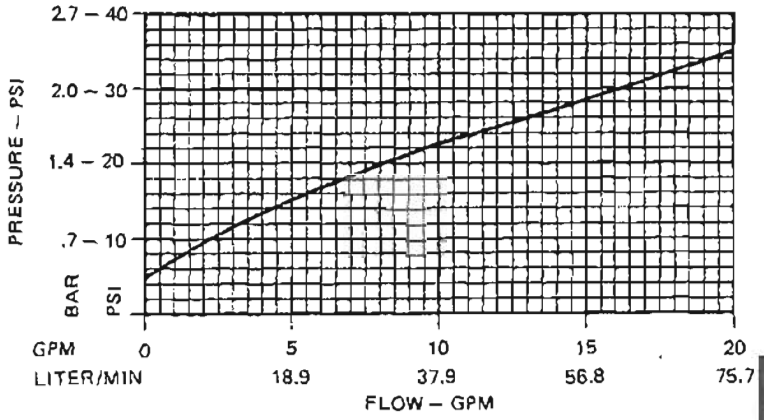
Technical Information

ENGINEERING PERFORMANCE DATA

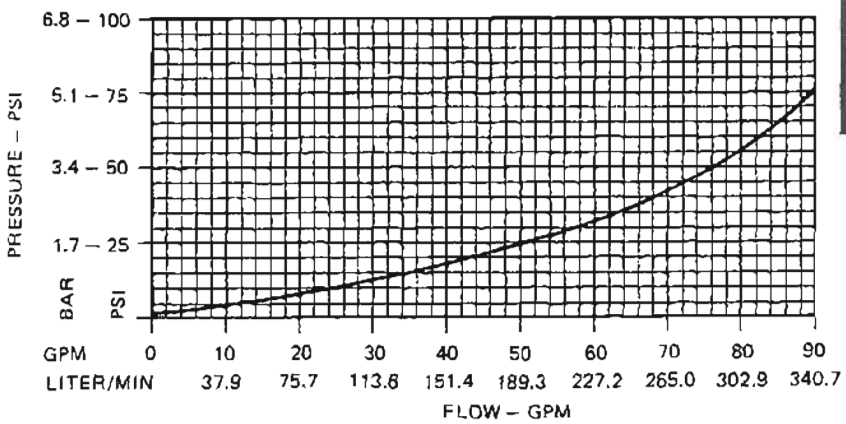
FM2 – REVERSE FLOW CHECK



FM3 – REVERSE FLOW CHECK



FM6 – REVERSE FLOW CHECK



E

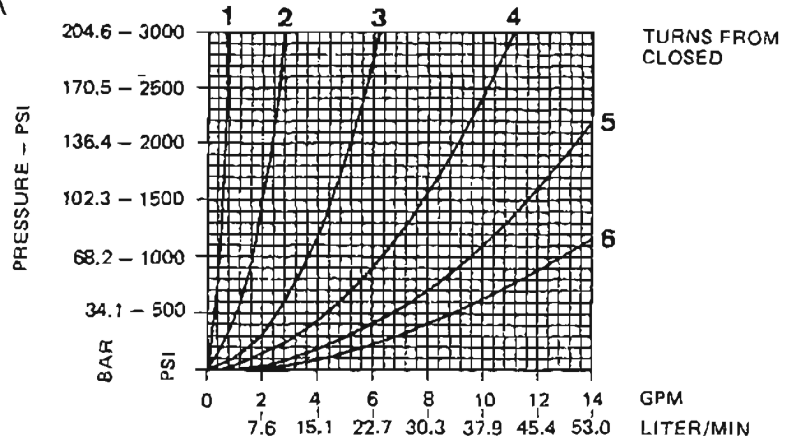
Curves were generated using 100 SSU hydraulic oil. For any other viscosity, pressure drop will change as per chart.

VISCOSITY CORRECTION FACTOR							
Viscosity (SSU)	75	150	200	250	300	350	400
Percentage of Δ P (Approx.)	93	111	119	126	132	137	141

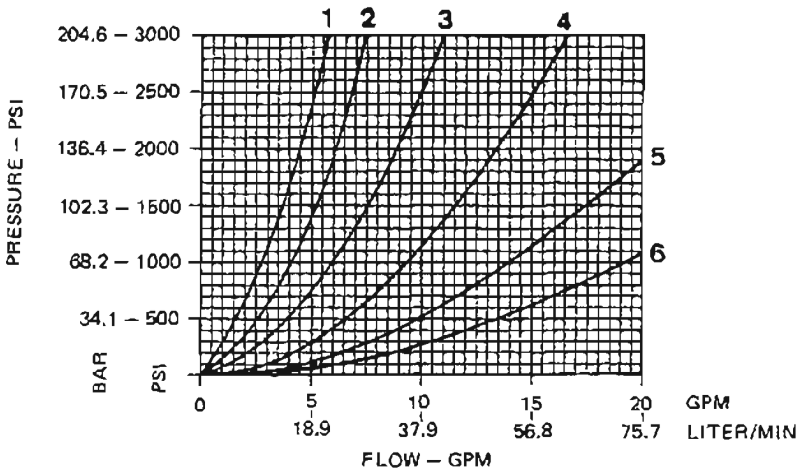
Technical Information

ENGINEERING PERFORMANCE DATA

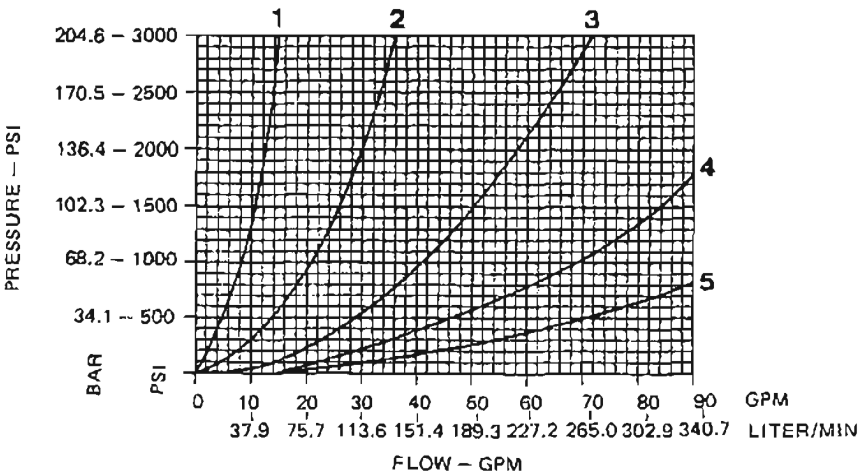
FM2D/ FINE NEEDLE



FM3D/FINE NEEDLE



FM6D/FINE NEEDLE



Curves were generated using 100 SSU hydraulic oil. For any other viscosity, pressure drop will change as per chart.

VISCOSITY CORRECTION FACTOR							
Viscosity (SSU)	75	150	200	250	300	350	400
Percentage of Δ P (Approx.)	93	111	119	126	132	137	141

For additional information – call your local Parker Fluidpower Motion & Control Distributor.

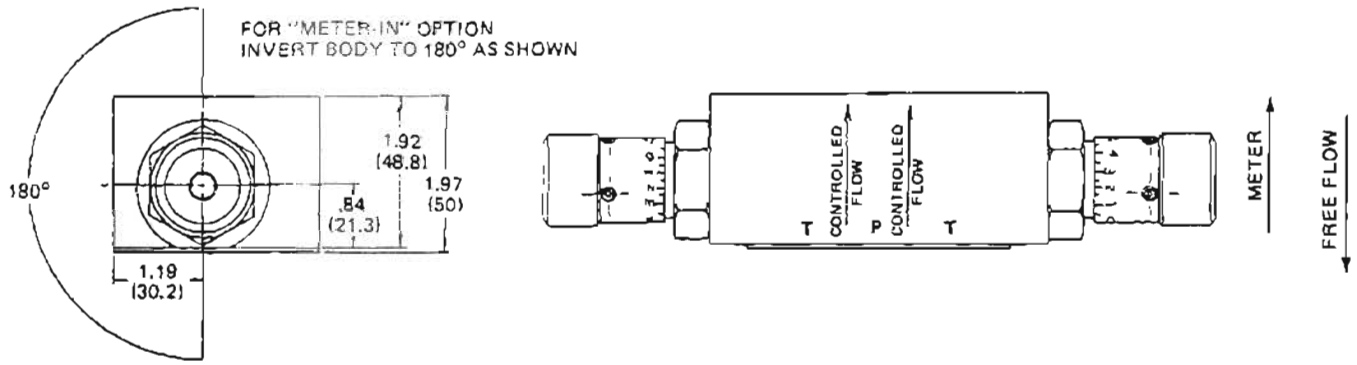
Technical Information

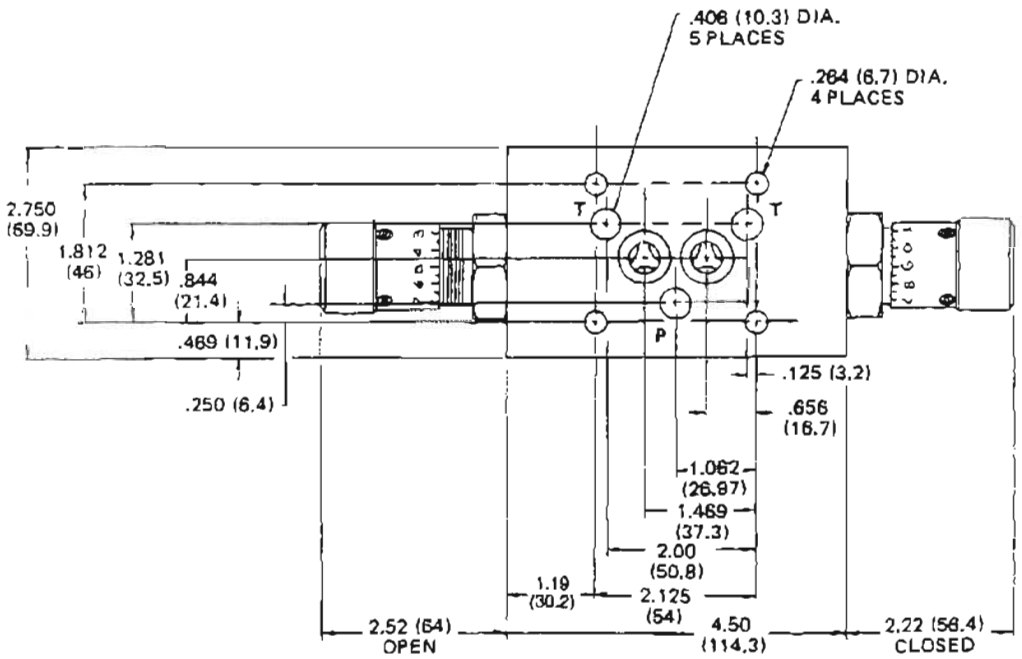
DIMENSIONS

"MILLIMETER EQUIVALENTS FOR INCH DIMENSIONS ARE SHOWN IN (**)"

MODEL FM3DD

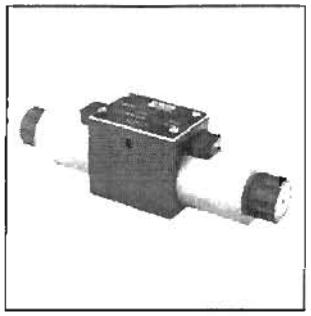
MANAPAK FLOW CONTROL VALVE

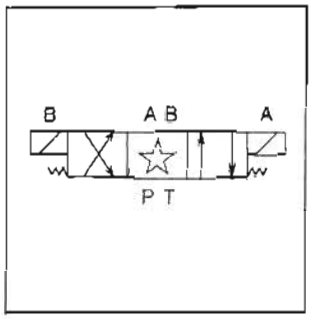


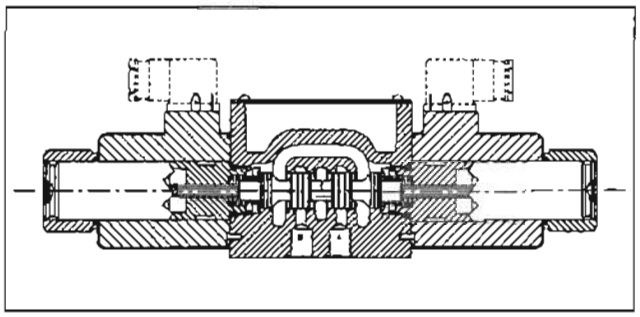


General Description

The D3W Series directional control valves are high-performance, 4-chamber, direct operated, wet armature, solenoid controlled 3 or 4-way valves. They are available in 2 or 3-position and conform to NFPA's D05/CETOP 5 mounting patterns.







Features

- Worldwide, high flow, low pressure drop design.
- Mechanically tunable soft shift.
- 22 spools available including proportional.
- Repairable manual override for easy seal replacement.
- DC surge suppression available to protect electrical equipment.
- Three electrical connection options.
- AC & DC lights available.
- Easy access mounting bolts.
- Explosion proof availability.
- CSA approved.
- No tools required for coil removal.
- Rectified coils available for high flow AC applications.

Response Time (ms)

Signal to 95% spool stroke measured at
172 Bar (2500 PSI) and 75 LPM (20 GPM)

Solenoid Type	Pull-In	Drop-Out
AC	21	35
DC	110	85

Specifications

Interface	NFPA D05, CETOP 5, NG 10
Max. Operating Pressure	P, A, B: 345 Bar (5000 PSI) Standard CSA 207 Bar (3000 PSI) Tank: 103 Bar (1500 PSI) Standard CSA 103 Bar (1500 PSI)
CSA File Number	LR060407

A

D	3	W				
Directional Control Valve	Basic Valve	Actuator	Spool	Style	Seal	Solenoid Voltage

Basic Valve: NFPA D05, CETOP 5, NG 10

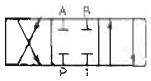
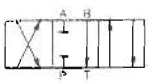
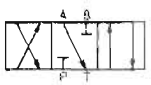
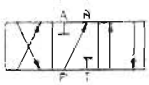
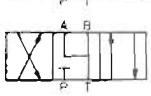
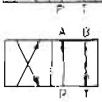
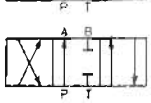
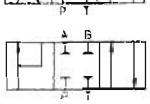
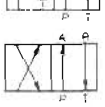
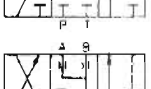
Actuator: Wet armature solenoid

Code	Description
E#	24/60 - 24/50 VAC
Y	120/60 - 110/50 VAC
T	240/60 - 220/50 VAC
K	12 VDC
J	24 VDC
D#	120 VDC
Z#	250 VDC

High Watt Coil only.

Code	Description
N	Nitrile
V	Fluorocarbon
E	EPR

* Contact HVD for availability.

Code	Symbol	Code	Symbol
1		14	
2		15	
3		16	
4		20*	
5		21†	
6		22†	
7		26*†	
8*, 9**		30**	
10†		81††	
11		82††	
12			

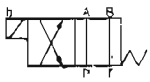
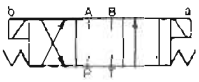
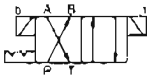
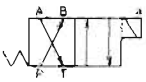
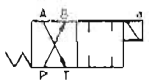
* 8, 20 & 26 spools have closed crossover.

** 9 & 30 spools have open crossover.

† Available only with high-watt rectified AC coils or high-watt DC coils.

†† Spring centered versions C, E, F, K & M only

Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing solenoid A. Note operators reverse sides for #8 and #9 spools. See installation information for details.

Code	Description	Symbol
B *	Single solenoid, 2 position, spring offset. P to A and B to T in offset position	
C	Double solenoid, 3 position, spring centered.	
D †	Double solenoid, 2 position, detent	
E	Single solenoid, 2 position, spring centered. P to B and A to T when energized.	
F	Single solenoid, 2 position. Spring offset, energized to center. Position spool spacer on A side. P to A and B to T in spring offset position.	
H *	Single solenoid, 2 position, spring offset. P to B and A to T in offset position.	
K	Single solenoid, 2 position. Spring centered. A side. P to A and B to T when energized.	
M	Single solenoid, 2 position, spring offset, energized to center position. Spool spacer on B side. P to B and A to T in spring offset position.	

* Only spools 20, 26 & 30.

† Only spools 20 & 30.

This condition varies with spool code.

Connector Package

Code	Description
C	Conduit Cavity
K	Conduit Adaptor
P	Hirschmann w/Plug
W	Hirschmann w/o Plug
S*†#	Double Spade
E	Explosion Proof

* Available only with J, K, Y (Rectified) and T (Rectified) voltages.
† Not CSA approved.
# DC voltage only.

Solenoid Options

Code	Coil
Omit	High Watt
D†	Explosion Proof, EExd
F*	Low Watt
U†	Explosion Proof, UL/CSA

* Available only with J, K, Y (Rectified) and T (Rectified) voltages.
† Explosion proof coils are 60 Hz at standard voltage; dual rating not available.

Tube Options

Code	Description
Omit	Low Pressure
H	High Pressure

Manual Override Options

Code	Description
Omit	Standard Tube
P	Extended Manual Override
R	Repairable Manual Override

Electrical Options

Code	Description
Omit	No Option
V#	Varistor Surge Suppressor
Z	AC Rectified with MOV Surge Suppressor

DC voltage only.

Shift Response and Indication

Code	Description
Omit	Standard Valve
S3	Soft Shift, 0.030" Orifice
S4	Soft Shift, 0.040" Orifice
S7	Soft Shift, 0.070" Orifice
I7	Monitor Switch*

* Single solenoid models only. Not CE or CSA approved.

Approvals

Code	Description
Omit	Standard Valve
4*	CSA Approval
K#	UL Recognition

* Not available with high pressure tube option.
# Contact HVD for availability.

Variations

Code	Description
Omit	Standard Valve
5	Signal Lights
6	Manaplug, Brad Harrison Mini
7	Manaplug, Brad Harrison Micro (M12x1)
56	Manaplug (Mini) with Lights
57	Manaplug (Micro) with Lights (M12x1)
1A	Manaplug (Mini) Single Sol. 5-Pin
1B	Manaplug (Micro) Single Sol. 5-Pin (M12x1)
1C	Manaplug (Mini) Single Sol. 5-Pin w/Lights
1D	Manaplug (Micro) Single Sol. 5-Pin w/Lights (M12x1)

Design Series
NOTE: Not required when ordering.

Mounting Bolt Kits

UNC Bolt Kits for use with D3W Directional Control Valves & Manapak/Cartpak				
	Number of Manapaks/Cartpaks @ 2.00" (50mm) thickness			
	0	1	2	3
D3W	BK98 1.62"	BK141 3.50"	BK142 5.50"	BK143 7.50"
D3W with explosion proof coils	BK144 2.37"	BK61 4.25"	BK62 6.25"	BK63 8.25"

NOTE: All bolts are SAE grade 8, 1/4-20 UNC-2A thread, torque to 16 Nm (12 ft-lbs)

Valve Weight:

Single Solenoid:	
AC	4.3 kg (9.5 lbs.)
DC	5.3 kg (11.6 lbs.)
Double Solenoid:	
AC	5.0 kg (11.0 lbs.)
DC	7.3 kg (16.0 lbs.)
Standard Bolt Kit:	BK98
Metric Bolt Kit:	BKM98

A

Solenoid Ratings**

Insulation	Class H
Allowable Deviation from rated voltage	DC, AC Rect -10% to +15% AC -5% to +5%
Armature	Wet pin type

** DC Solenoids available with optional molded metal oxide varistor (MOV) for surge suppression.
Leadwire length 6" from coil face.

D3W*****F Solenoid Electrical Characteristics‡

Solenoid Code	Nominal Volts/Hz	In Rush Amps	Holding Amps	Watts
KF	12 VDC	—	3.00	18
JF	24 VDC	—	0.75	18

‡ Based on nominal voltage @ 22°C (72°F)

D3W Solenoid Electrical Characteristics†

Solenoid Code	Nominal Volts/Hz	In Rush VA	Holding VA	Nominal Watts (Ref)
Y	120/60 110/50	298 294	95 102	32
T	240/60 220/50	288 288	96 101	32
E	24/60 24/50	290 381	77 110	32
K	12 VDC	—	3.00†	36
J	24 VDC	—	1.50†	36
D	120 VDC	—	0.30†	36

† DC holding amps.

D3W Rectified AC Solenoid Electrical Characteristics‡

Solenoid Code	Nominal Volts/Hz	In Rush Amps	Holding Amps	Watts
Y	120/60 110/50	—	.37	36
T	240/60 220/50	—	.18	36
YF	120/60 110/50	—	.18	18
TF	240/60 220/50	—	.09	18

‡ Based on nominal voltage @ 22°C (72°F)

Explosion Proof Solenoids

Explosion Proof Solenoid Ratings

U.L. (EU) C.S.A.	Class I, Div. 1 & 2, Groups C & D Class II, Div 1 & 2, Groups E, F & G As defined by the N.E.C
ATEX	Complies with ATEX requirements for: Exd, Group IIB; EN50014: 1999+ Amds 1 & 2, EN50018: 200

Electrical Characteristics* ED and EU†

Solenoid Code	Nominal Volts/Hz	In Rush VA	Holding VA	Nominal Watts (Ref)
Y	120/60	266	82	36
T	240/60	266	82	36
K	12 VDC	—	3.00†	36
J	24 VDC	—	1.50†	36
D	120 VDC	—	0.30†	36

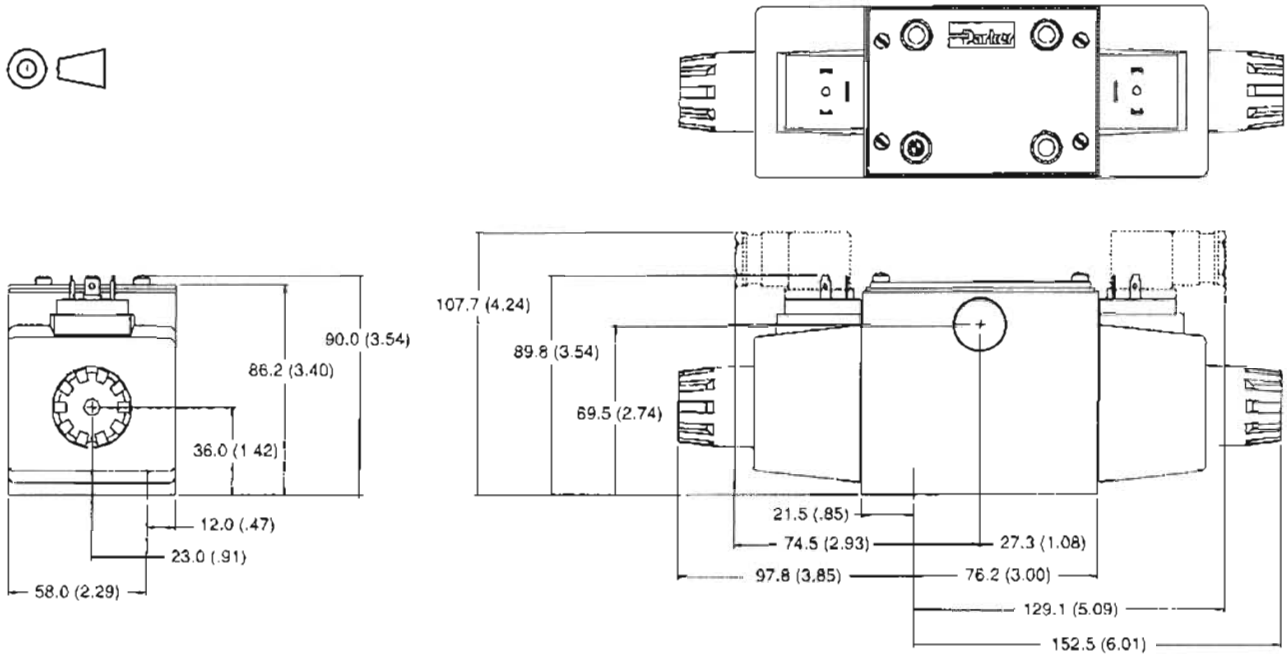
*** Dual frequency not available on explosion proof coils.**

† DC holding amps.

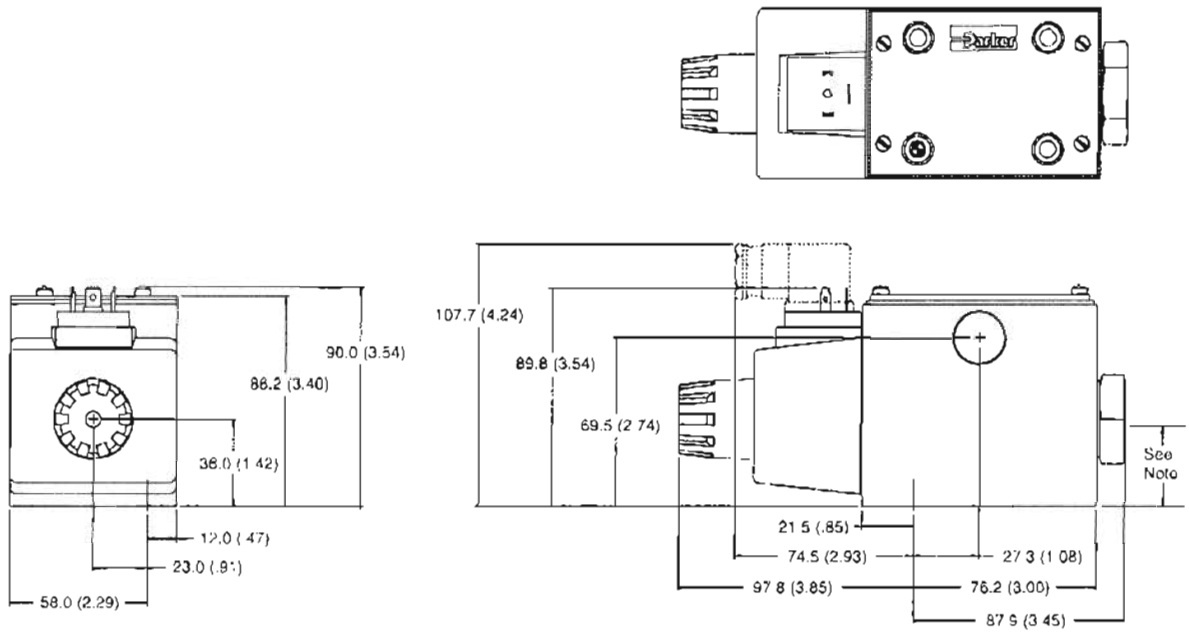
Inch equivalents for millimeter dimensions are shown in (**)

A

Hirschmann, Double AC Solenoid



Hirschmann, Single AC Solenoid



Note: 30.0mm (1.18") from bottom of bolt counterbore.

A

Conduit Box

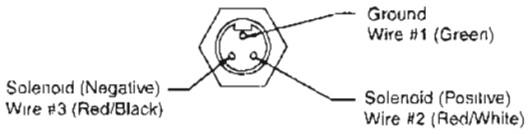
(connection option K)

Interface
- 152.4 cm (6.0 inch) lead wires, 18 awg.
- NEMA 4 rating available (consult factory)
- Waterproof

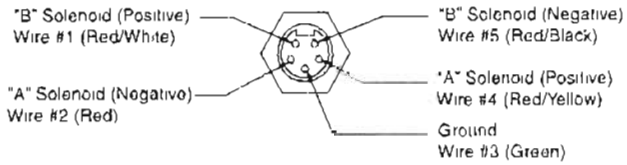
Manaplug

(valve variations 6, 56, 1A, 1C)

Interface
- Brad Harrison Plug
- 3-Pin for Single Solenoid
- 5-Pin for Double Solenoid

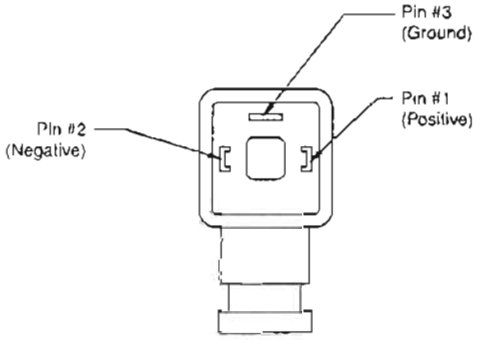


3-Pin Manaplug (Mini) with Lights
Single Solenoid Valves



5-Pin Manaplug (Mini) with Lights
Single and Double Solenoid Valves
("A" and "B" Solenoids Reversed for #8 and #9 Spools)

Hirschmann Plug with Lights

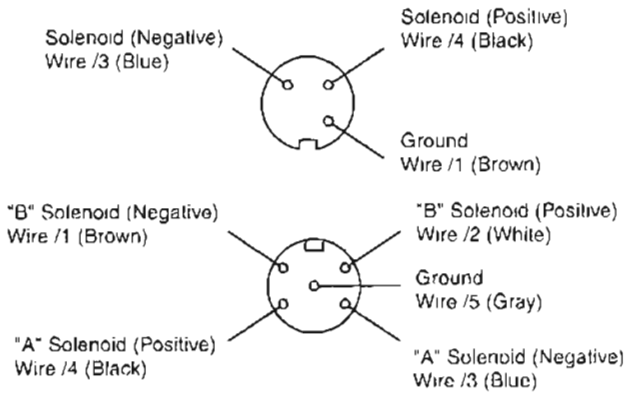


Face View of Plug

Conforms to DIN43650, ISO4400, Form A 3-Pin

Manplug - Micro Connector

(valve variations 7, 57, 1B, 1D)



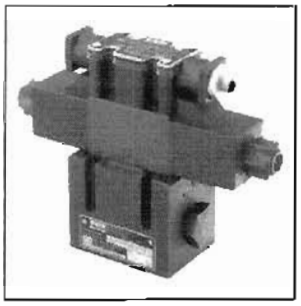
A

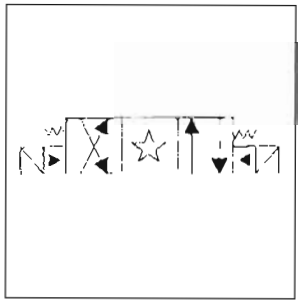
General Description

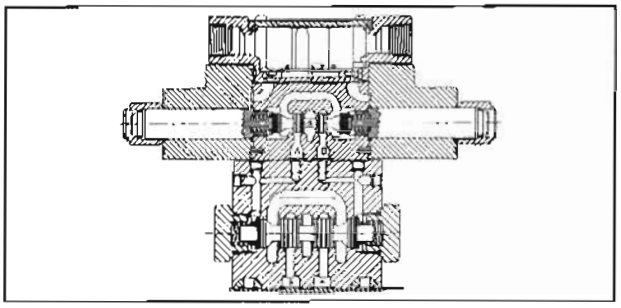
Parker's D31*W is a five-chamber, pilot operated, solenoid controlled, directional control valve. The valve is suitable for manifold or subplate mounting.

Features

- **World design** – Available worldwide.
- **Mounting bolts below center line of spool** – Minimizes spool binding.
- **Five chamber style** – Eliminates pressure spikes in tubes, increasing valve life.
- **High pressure and flow ratings** – Increased performance options in a compact valve.







Specifications

Mounting Pattern	NFPA D05H, NFPA D05HE, CETOP 5H
Max. Operating Pressure	345 Bar (5000 PSI) Standard CSA 207 Bar (3000 PSI)
Max. Tank Line Pressure	Internal Drain Model: 103 Bar (1500 PSI) Standard 207 Bar (3000 PSI) Optional External Drain Model: 207 Bar (3000 PSI) CSA 103 Bar (1500 PSI)
Maximum Drain Pressure	103 Bar (1500 PSI) Standard 207 Bar (3000 PSI) Optional CSA 103 Bar (1500 PSI)
Minimum Pilot Pressure	6.9 Bar (100 PSI)
Maximum Pilot Pressure	345 Bar (5000 PSI) Standard CSA 207 Bar (3000 PSI)
Nominal Flow	76 Liters/Min (20 GPM)
Maximum Flow	See Switching Limit Charts

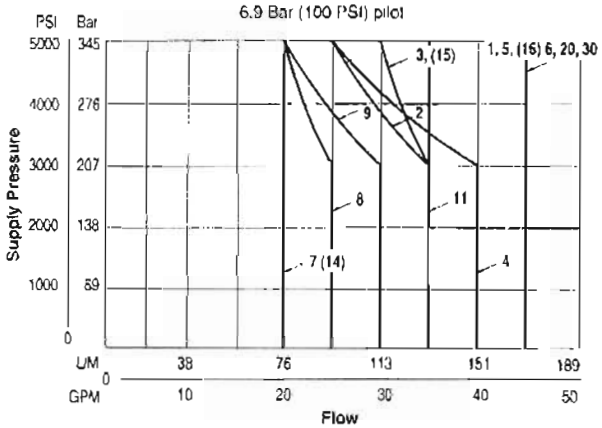
Response Time

Nominal response time (milliseconds) at 345 Bar (5000 PSI) is 76 L/M (20 GPM)

Solenoid Type	Pilot Pressure	Pull-In	Drop-Out
DC	500	40	50
	1000	36	50
	2000	34	50
AC	500	20	33
	1000	18	33
	2000	13	33

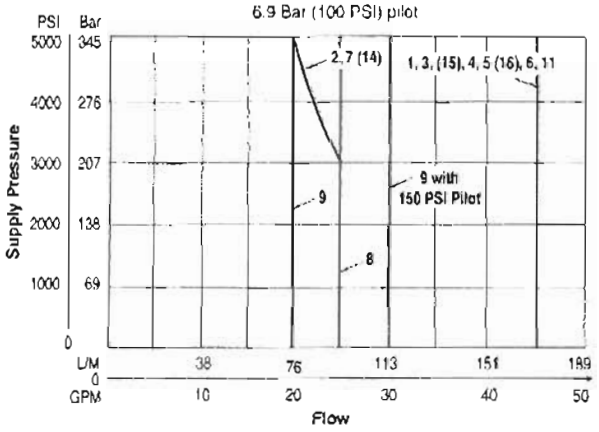
Switching Limit Charts

For Styles B, C, E, H and K
D Style -- external drain only (For internal drain see note below)
6.9 Bar (100 PSI) pilot



Note: Internal Drain
1, 4 spools – 113 L/M (30 GPM) max., 7 spool -- per curve
All others -- 95 L/M (25 GPM) max

For Styles F and M -- external drain only.
(For internal drain see note below)
6.9 Bar (100 PSI) pilot



Note: Internal Drain
1, 4 spools -- 113 L/M (30 GPM) max., 2, 9 & 14 spools – per curve
All others -- 95 L/M (25 GPM) max.

2502-A3.p65, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

D							
Directional Control Valve	Basic Valve	Actuator#	Spool	Style	Pilot Supply and Drain	Seal	Solenoid Voltage

Code	Description
31D	NFPA D05, CETOP 5, DIN NG10, D03 Pilot, ISO Port
31V	NFPA D05, CETOP 5, DIN NG10 D03 Pilot, NFPA Port

Code	Description
W	Solenoid, Wet Pin, Screw-In
HW	Reversed Wiring

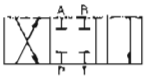
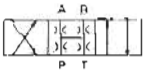
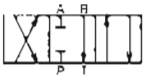
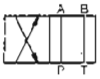
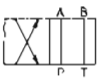
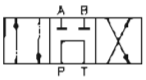
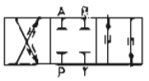
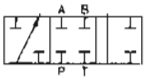
Valve schomatic symbols are per NFPA/ ANSI standards, providing flow P to A when energizing solenoid A. Note operators reverse sides for #008 and #009 spools. See installation information for details. To configure per DIN standards (A coil over A port, B coil over B port) code valves as D31VHW***.

Code	Description
1	Internal Pilot, External Drain
2	External Pilot, External Drain
4#	Internal Pilot, Internal Drain
5	External Pilot, Internal Drain

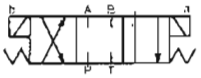
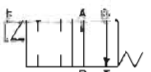
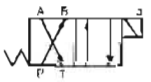
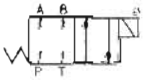
Not available with 002, 007, 008, 009 or 014 spools.

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
A	24/50 VAC
D	120 VDC
G	198 VDC
J	24 VDC
K	12 VDC
L	6 VDC
N	220/50 VAC
Q	100/60 VAC
R	24/60 VAC
T	240/60 - 220/50 VAC
U	98 VDC
Y	120/60 - 110/50 VAC
Z	250 VDC

Code	Symbol	Code	Symbol
001		011	
002		012	
003		014	
004		015	
005		016	
006		020*	
007		030**	
008*, 009**		081	
010		082	

* 008, 020 & 026 spool have closed crossover.
** 009 & 030 spool have open crossover.

Code	Description	Symbol
B*	2 position, spring offset P to A	
C	3 position, spring centered	
D†	2 position, detent, P to A and B to T	
E	2 position, spring centered and P to B	
F	2 position, spring offset P to A and centered	
H*	2 position, spring offset P to B	
K	2 position, spring centered and P to A	
M	2 position, spring offset P to B and centered	

* 020 and 030 spools only.
† 020 and 030 spools only.

A

Solenoid Connection | Coil Options | Tube Options | Manual Override Options | Electrical Options | Shift Response and Indication | Approvals | Valve Variations | Design Series

NOTE: Not required when ordering.

Code	Description
C	Conduit Box
D	Metric Plug (M12X1), DESINA
E	Explosion Proof
G	Plug-in
H*†	Single Spade
J**†	Deutsch (DT06-25)
L	Dual Screw Lug
M**†	Metri-Pack (150)
P	DIN with Plug
S	Double Spade
W*	DIN without Plug

* Not available with lights.
** See valve variations for others.
† DC only.

See next page for Valve Variations

Code	Description
Omit	Standard Valve
4*	C.S.A. Approved

* Not available with high pressure tube.

Code	Description
Omit	Standard Response, No Switch
I1	Monitor Switch, "A" Port End
I2	Monitor Switch, "B" Port End
I3	Monitor Switch, "A" & "B" Port End
I4	Monitor Switch, Start "A" Port
I5	Monitor Switch, Start "B" Port
I6	Monitor Switch, "A" & "B" Port Start

Code	Description
Omit	No Options
J*	Diode Surge Suppressor
B	Rectified Coil

* DC only.

Code	Description
Omit	High Watt
D	Explosion Proof, EEXD ATEX
E	Explosion Proof, EEXME ATEX
F**	Low Watt
C†	CSA Hazardous Location
L***	8 Watt
O	Explosion Proof, MSHA
U	Explosion Proof, UL/CSA
X*	No Coils

* See solenoid voltage code to specify proper tube.
** AC only.
*** DC/AC Rectified only.
† Applicable to conduit box and plug-in style only.

Code	Description
Omit	Low Pressure, AC only
H	High Pressure, AC only
M	Low Pressure, DC only
G	High Pressure, DC only

Code	Description
Omit	Standard
P	Extended with Boot
T	None
R	Repairable
W	Waterproof Protection

Valve Weight:
Double Solenoid 5.4 kg (12.0 lbs.)
Standard Bolt Kit: BK98

A

Valve Variations

Code	Description	D31*W	D61*W	D81*W	D101*W
5	Signal Lights				
6	Manaplug – Brad Harrison Mini				
7A	Manaplug – Brad Harrison (12x1) Micro				
56	Manaplug (Mini) with Lights				
7B	Manaplug (Micro) with Lights (D1 only)				
20	Fast Response				
1A	Manaplug (Mini) Single Sol. 5-pin				
1B	Manaplug (Micro) Single Sol. 5-pin				
1C	Manaplug (Mini) Single Sol. 5-pin, with Lights				
1D	Manaplug (Micro) Single Sol. 5-pin, with Lights				
1E	Manaplug (Mini) Single Sol. 5-pin, with Stroke Adjust "A" & "B" End				
1F	Manaplug (Micro) Single Sol. 5-pin, with Stroke Adjust "A" & "B" End				
1G	Manaplug (Mini) Single Sol. 5-pin, with Stroke Adjust "A" & "B" End and Lights				
1H	Manaplug (Micro) Single Sol. 5-pin, with Stroke Adjust "A" & "B" End and Lights				
2B	On Board Bus – SDS				
2C	Manaplug (Micro) with Bus Wiring				
3A	Pilot Choke Meter Out				
3B	Pilot Choke Meter In				
3C	Pilot Pressure Reducer				
3D	Stroke Adjust "B" End				
3E	Stroke Adjust "A" End				
3F	Stroke Adjust "A" & "B" End				
3G	Pilot Choke Meter Out with Lights				
3H	Pilot Choke Meter In with Lights				
3J	Pilot Pressure Reducer with Lights				
3K	Pilot Choke Meter Out with Stroke Adjust "A" & "B" End				
3L	Pilot Choke Meter Out, Stroke Adjust "A" & "B" End with Lights and Manaplug and Brad Harrison Mini				
3M	Pilot Choke Meter Out, Pilot Pressure Reducer, Stroke Adjust "A" & "B" End				
4B	Protection Cap for Monitor Switch				
4D	Twist & Lock Override (Old 5426)				
4E	Push Manual Override (Old x5450)				

Bolt Kits

BK — Bolt Kits

□ — Number of Manapaks

Code	Description
BK98	Valve alone
141	1 Manapak
142	2 Manapaks
143	3 Manapaks

A

Solenoid Ratings

Insulation System	Class F
Allowable Deviation from rated voltage	-10% to +15% for DC and AC rectified coils -5% to +5% for AC Coils
Armature	Wet pin type
CSA File Number	LR60407
Environmental Capability	DC Solenoids are rated at NEMA 4 (IP67) or better when properly wired and installed. Contact HVD for AC coil applications.

Explosion Proof Solenoid Ratings*

U.L. & CSA (EU)	Class I, Div 1 & 2, Groups C & D Class II, Div 1 & 2, Groups E, F & G As defined by the NEC
M.S.H.A. (EO)	Complies with 30CFR, Part 18
ATEX (ED)	Complies with ATEX requirements for: Exd, Group IIB; EN50014: 1999+ Amds. 1 & 2, EN50018: 2000
CSA Hazardous Location	Class II, Groups E, F & G

* Allowable Voltage Deviation +/- 10%
Note that AC coils are single frequency only.

Code		Voltage	In Rush Amps	In Rush Amps	Holding Amps	Watts	Resistance
Voltage Code	Power Code		Amperage	D1VW.VA @ 3MM	D1VW	D1VW	D1VW
A		24/50 VAC, High Watt	7.00 Amps	168 VA	2.65 Amps	28 W	1.67 ohm(s)
D	L	120 VDC	N/A	N/A	0.09 Amps	10 W	1584.00 ohm(s)
			N/A	N/A	0.26 Amps	30 W	528.00 ohm(s)
E		24/60 VAC, High Watt	6.00 Amps	144 VA	1.85 Amps	20 W	1.67 ohm(s)
		24/50 VAC, High Watt	7.00 Amps	168 VA	2.65 Amps	28 W	1.67 ohm(s)
G	L	198 VDC	N/A	N/A	0.05 Amps	10 W	3920.40 ohm(s)
			N/A	N/A	0.15 Amps	30 W	1306.80 ohm(s)
J	L	24 VDC	N/A	N/A	0.44 Amps	10 W	51.89 ohm(s)
			N/A	N/A	1.32 Amps	30 W	17.27 ohm(s)
K	L	12 VDC	N/A	N/A	0.88 Amps	10 W	12.97 ohm(s)
			N/A	N/A	2.64 Amps	30 W	4.32 ohm(s)
L	L	6 VDC	N/A	N/A	1.67 Amps	10 W	3.59 ohm(s)
			N/A	N/A	5.00 Amps	30 W	1.20 ohm(s)
M	L	9 VDC	N/A	N/A	1.11 Amps	10 W	8.12 ohm(s)
			N/A	N/A	3.35 Amps	30 W	2.67 ohm(s)
P		110/50 VAC			0.38 Amps	19 W	135.00 ohm(s)
R		24/60 VAC, High Watt	8.00 Amps	192 VA	2.70 Amps	27 W	1.40 ohm(s)
	F	24/60 VAC, Low Watt	6.67 Amps	160 VA	2.20 Amps	23 W	1.52 ohm(s)
S	***Specials***	SEE BELOW					
T		240/60 VAC, High Watt	0.77 Amps	185 VA	0.26 Amps	25 W	134.50 ohm(s)
		220/50 VAC, High Watt	0.82 Amps	180 VA	0.31 Amps	27 W	134.50 ohm(s)
	F	240/60 VAC, Low Watt	0.70 Amps	168 VA	0.22 Amps	21 W	145.00 ohm(s)
	F	220/50 VAC, Low Watt	0.75 Amps	165 VA	0.26 Amps	23 W	145.00 ohm(s)
U	L	98 VDC	N/A	N/A	0.10 Amps	10 W	960.00 ohm(s)
X	L	16 VDC	N/A	N/A	0.63 Amps	10 W	25.60 ohm(s)
Y		120/60 VAC, High Watt	1.55 Amps	186 VA	0.49 Amps	25 W	33.70 ohm(s)
		110/50 VAC, High Watt	1.65 Amps	182 VA	0.58 Amps	27 W	33.70 ohm(s)
	F	120/60 VAC, Low Watt	1.40 Amps	168 VA	0.42 Amps	21 W	36.50 ohm(s)
	F	110/50 VAC, Low Watt	1.50 Amps	165 VA	0.50 Amps	23 W	36.50 ohm(s)
	L*B	120/60 VAC, 10 Watt	0.63 Amps	83 VA	0.18 Amps	10 W	75.00 ohm(s)
	L*B	110/50 VAC, 10 Watt	0.73 Amps	79 VA	0.20 Amps	10 W	75.00 ohm(s)
	*H	120/60 VAC, High Pressure	1.40 Amps	168 VA	0.50 Amps	26 W	36.50 ohm(s)
	*H	110/50 VAC, High Pressure	1.48 Amps	163 VA	0.60 Amps	28 W	36.50 ohm(s)
Z	L	250 VDC	N/A	N/A	0.04 Amps	10 W	6875.00 ohm(s)
			N/A	N/A	0.13 Amps	30 W	1889.64 ohm(s)
Specials S		Other voltages/frequencies may be available Contact HVD for more information					
Explosion Proof Solenoids							
R		24/60 VAC	7.63 Amps	183 VA	2.65 Amps	27 W	1.99 ohm(s)
T		240/60 VAC	0.76 Amps	183 VA	0.29 Amps	27 W	1.34 ohm(s)
N		220/50 VAC	0.77 Amps	169 VA	0.31 Amps	27 W	1.38 ohm(s)
Y		120/60 VAC	1.60 Amps	192 VA	0.58 Amps	27 W	33.50 ohm(s)
P		110/50 VAC	1.47 Amps	162 VA	0.57 Amps	27 W	34.70 ohm(s)
Q		100/60 VAC	1.90 Amps	192 VA	0.70 Amps	27 W	38.60 ohm(s)
K		12 VDC	N/A	N/A	2.75 Amps	33 W	4.36 ohm(s)
J		24 VDC	N/A	N/A	1.38 Amps	33 W	17.33 ohm(s)
D		120 VDC	N/A	N/A	0.28 Amps	33 W	420.92 ohm(s)
Z		250 VDC	N/A	N/A	0.13 Amps	33 W	1952.66 ohm(s)

A

D31*W Series Pressure Drop vs. Flow

The chart below provides the flow vs. pressure drop curve reference for the D31VW Series valves by spool type.

Example:
Find the pressure drop at 76 L/M (20 GPM) for a D31VW with a number 1 spool. To the right of spool number 1, locate the number 3 in the P-A column, and 2 in the B-T column.

Using the graph at the bottom, locate curves 2 and 3 and read the pressure drop values. Total pressure drop through the valve is the sum of the two values.

Note: Pressure drops should be checked for all flow paths, especially when using non-symmetrical spools 003, 005, 007, 014, 015 and 016) and unbalanced actuators.

D31*W Pressure Drop Reference Chart

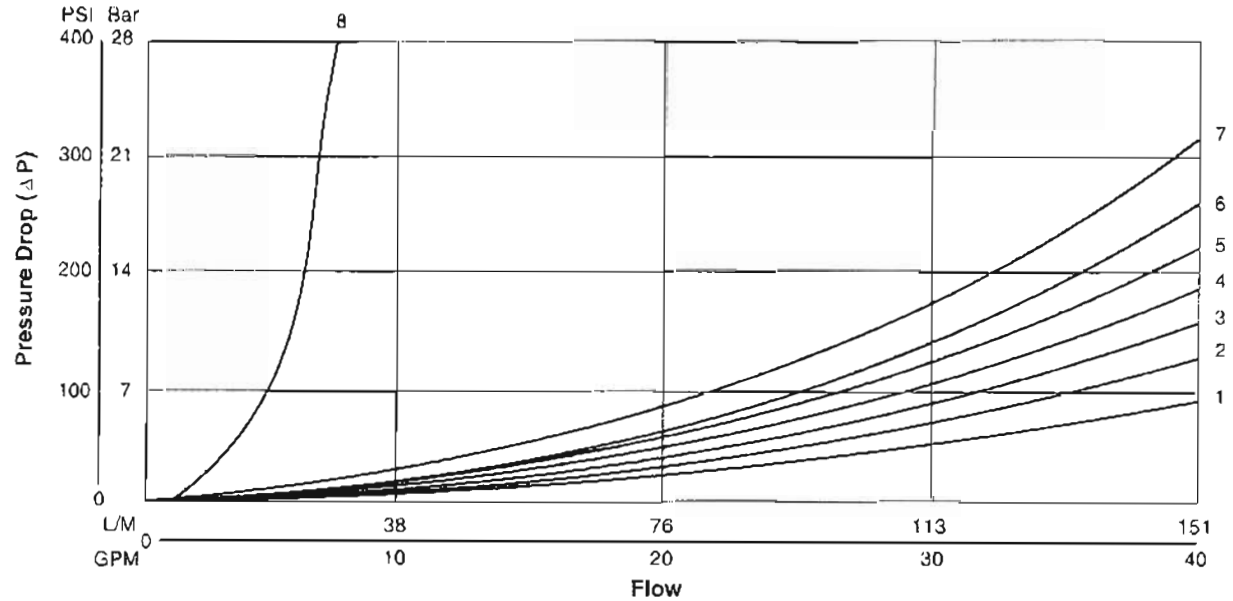
Spool No.	Curve Number										
	Shifted				Center Condition						
	P-A	P-B	B-T	A-T	(P-T)	(B-A)	(A-B)	(P-A)	(P-B)	(A-T)	(B-T)
001	3	3	2	1	-	-	-	-	-	-	-
002	3	3	1	1	3	3	3	4	4	1	1
003	3	3	1	1	-	-	-	-	-	3	-
004	3	3	1	1	-	-	-	-	-	1	1
005	3	3	1	1	-	-	-	5	-	-	-
006	3	3	1	1	-	5	7	6	5	-	-
007	4	2	1	1	4	-	-	-	3	-	2
009	3	3	1	1	7	-	-	-	-	-	-
010	3	2	-	-	-	-	-	-	-	-	-
011	3	2	1	1	-	-	-	-	-	8	8
014	2	4	1	1	4	-	-	4	-	2	-
015	3	2	4	1	-	-	-	-	-	-	4
016	5	2	1	1	-	-	-	-	5	-	-
020	5	4		2	2	-	-		-	-	-
030	4	3		1	1	-	-	-	-	-	-

Viscosity Correction Factor

Viscosity (SSU)	75	150	200	250	300	350	400
% of ΔP (Approx.)	93	111	119	126	132	137	141

Curves were generated using 110 SSU hydraulic oil.
For any other viscosity, pressure drop will change per chart.

Pressure Drop Chart



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HVD = Hydraulic Valve Division HCD = Hydraulic Controls Division

Parker					Spool Symbol					Spool: D1V*	Spool: D1V*	Spool: D3W	Spool: D31DW	Spool: D41	Spool: D41*W	Spool: D61VW	Spool: D81/D91	Spool: D101VW	Spool: D111
Spool Number	Closed Crossover	Open Crossover	Symmetrical	Standard	A		0		B	D1VW: D1VHW	D1V*: A/C/P/ D/G/L	D3DW/ D31DW	Double Monitor Switch	HCD	Double Monitor Switch	HVD	HCD	HVD	HCD
001	x		x	x															
002		x	x	x															
003	x			x															
004	x		x	x															
005	x			x															
006	x		x	x															
007		x		x															
008	x		x	x															
009		x		x															
010	x			x															
011		x		x															
012		x	x	x															
014		x		x															
015	x			x															
016	x			x															
020B	x			x															
020D	x			x															
020H	x			x															
021	x			x															
022	x			x															
023		x																	
026B	x			x															
026H	x			x															
030B		x		x															
030D		x		x															
030H		x		x															
031	x																		
032	x																		
033																			
034	x																		
035	x																		
038																			
039																			
042	x		x																
043B																			
043H																			
044		x																	
044B		x																	
044H		x																	
047																			

Spools shown may be nonstandard. Please contact HVD for availability.

HVD = Hydraulic Valve Division HCD = Hydraulic Controls Division

Parker					Spool Symbol					Spool: D1V*	Spool: D1V*	Spool: D3W	Spool: D31DW	Spool: D41	Spool: D41*W	Spool: D61VW	Spool: D81/D91	Spool: D101VW	Spool: D111
Spool Number	Closed Crossover	Open Crossover	Symmetrical	Standard	A		0		B	D1VW: D1VHW	D1V*: A/C/P/ D/G/L	D3DW/ D31DW	Double Monitor Switch	HCD	Double Monitor Switch	HVD	HCD	HVD	HCD
049B	x			x															
049H	x																		
051	x																		
054		x																	
055																			
056	x																		
058		x																	
059		x																	
061		x																	
062		x																	
065B																			
065H																			
066																			
067	x																		
068B	x																		
068H	x																		
069B	x																		
069H	x																		
070B																			
070H																			
071B	x																		
071H	x																		
073																			
074H																			
076	x			x															
078	x			x															
079																			
080																			
081	x		x	x															
081B																			
081H																			
082	x		x	x															
083B	x																		
083H	x																		
084																			
085																			
098																			
099																			
100																			
101B	x																		

Spools shown may be nonstandard. Please contact HVD for availability.

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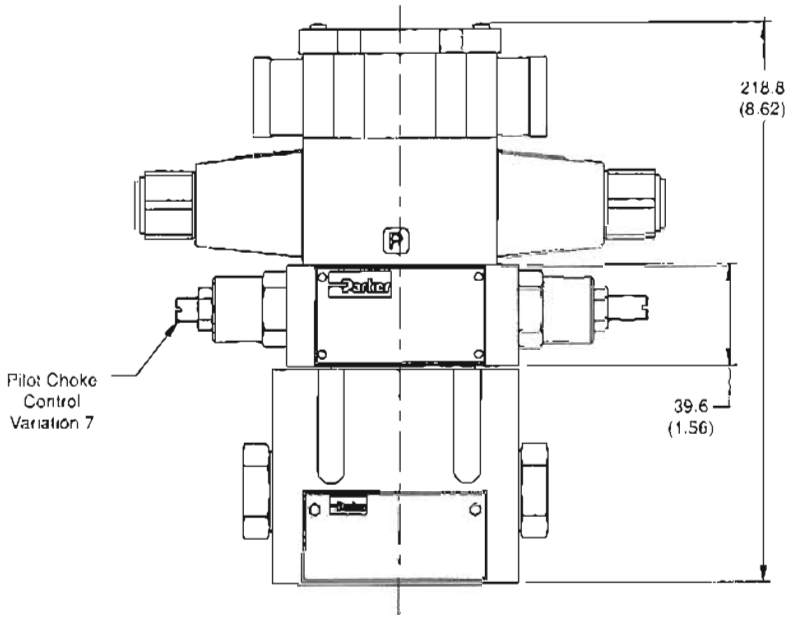
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

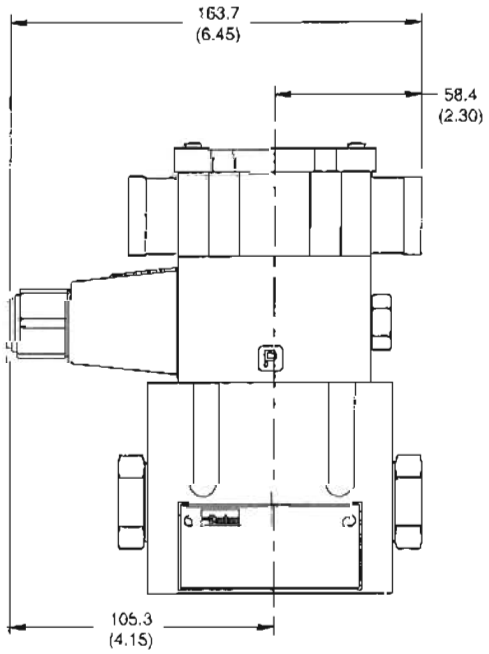
Inch equivalents for millimeter dimensions are shown in (**)

A

Conduit Box and Pilot Choke Control, Double AC Solenoid

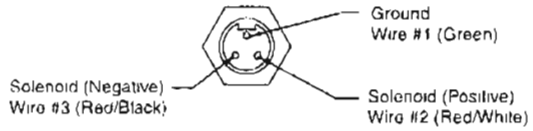


Conduit Box, Single AC Solenoid

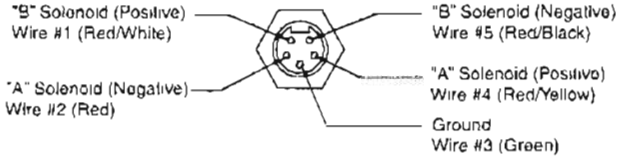


Manaplug (option 6, 630)

Interface – Brad Harrison Plug
– 3-Pin for Single Solenoid
– 5-Pin for Double Solenoid



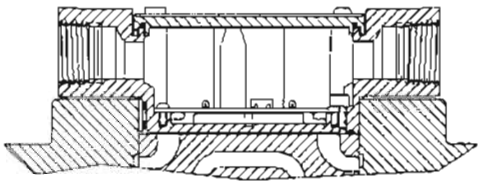
3-Pin Manaplug (Mini) with Lights
Single Solenoid Valves



5-Pin Manaplug (Mini) with Lights
Single and Double Solenoid Valves
("A" and "B" Solenoids Reversed for #8 and #9 Spools)

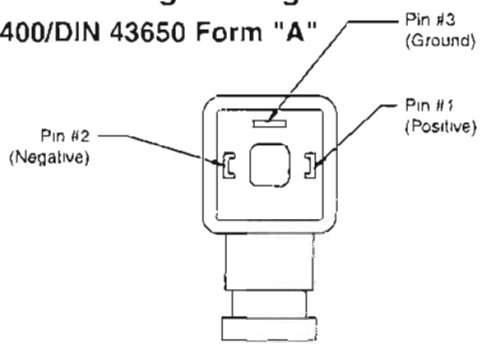
Conduit Box (Standard/Plug-In)

Interface – 6" lead wires, 18 awg.
Nema 4 rated – Waterproof



Hirschmann Plug with Lights

ISO 4400/DIN 43650 Form "A"

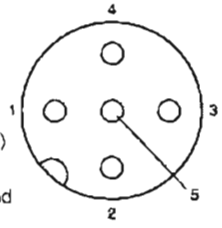


Face View of Plug

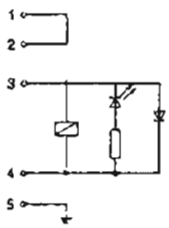
DESINA Connector

M12 pin assignment
Standard

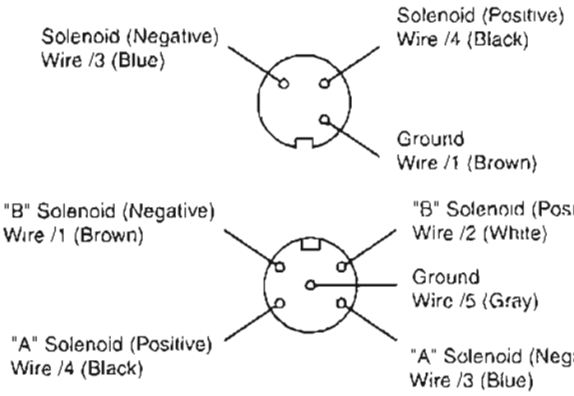
1 = Not used
2 = Not used
3 = 0V
4 = Signal (24 V)
5 = Earth Ground



DESINA – design
Pin 1 and 2
connected

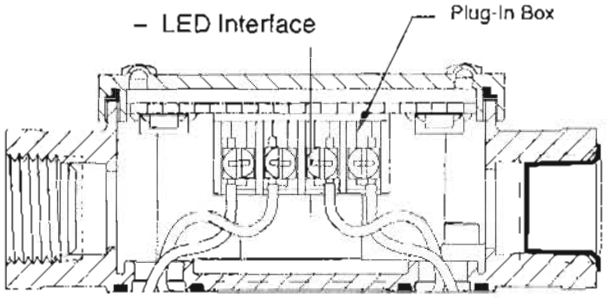


Micro Connector Options



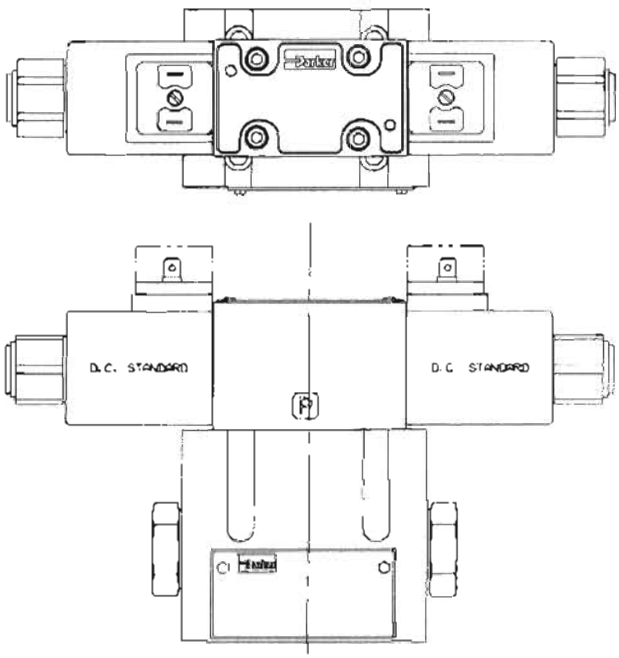
Signal Lights

– LED Interface



Dual Spade Lug (option S, DC only)

Interface – SAE 1 B-0.25
Automotive-type Spade



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Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Appendix "J"

Hog's Back Swing Bridge Maintenance Schedule

Technical Procedures	April		May				June				July				August				September				October				November			
Month & Week ⇨	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Bridge Preparation Item 3.0																														
Traffic Control Item 4.0																														
Monthly Maintenance Item 5.0																														
Tri-monthly Maintenance Item 6.0																														
Bridge Balance Test Item 7.0																														
Monthly Inspections Item 8.0																														
Winter Lay up Item 9.0																														
Weekly Inspection																														

Appendix "K"

Sheet 1

Electrical Test Record Sheet

Voltage potential three phase _____

Voltage potential single phase _____

Date tests recorded _____

	Voltage			
Traffic gate lower	1	2	3	4
Traffic gate raise	1	2	3	4
Draw wedges	Start		Run	
Drive wedges	Start		Run	
Open bridge	Start		Run	
Close bridge	Start		Run	

	Amps			
Traffic gate lower	1	2	3	4
Traffic gate raise	1	2	3	4
Draw wedges	Start		Run	
Drive wedges	Start		Run	
Open bridge	Start		Run	
Close bridge	Start		Run	

_____ _____

Signature Date

Appendix "K"

Hydraulic Test Recording Sheet

	Hydraulic Pressure P.S.I.	
Drive wedges	Start _____	Run _____
Drive wedges	Start _____	Run _____
Open bridge	Start _____	Run _____
Close bridge	Start _____	Run _____

Traffic gate lower	1	2	3	4
Traffic gate raise	1	2	3	4
Draw wedges	_____			
Drive wedges	_____			
Open bridge	_____			
Close bridge	_____			

_____ _____

Signature Date

Appendix “K”

Sheet 2

Electrical Test Record Sheet

Hydraulic Power Unit 30.20 HP Megger _____

Hydraulic Standby Unit 10.15 HP Megger _____

Traffic Gate Electric Motor Megger 1. _____

Traffic Gate Electric Motor Megger 2. _____

Traffic Gate Electric Motor Megger 3. _____

Traffic Gate Electric Motor Megger 4. _____

Traffic Lights Megger 2. _____

Traffic Lights Megger 4. _____

Traffic Lights Megger Spare _____

					Check	
Traffic Signal Bells					_____	_____
Traffic Signal Bells		Spare			_____	_____
Portage Tunnel, West Side, 4 lights		_____	_____		_____	_____
Pedestrian Tunnel East Side 5 lights	_____	_____	_____		_____	_____
		Spare	_____			

_____ _____

Signature Date

Appendix "K"

Sheet 3

Electrical Test Record Sheet

Cable Megger Tests

Cable	Megger Cable	Megger Cable	Megger

Notes:

Signature

Date

INSTRUCTIONS TO TENDERERS

1. Address

The tender envelope shall be addressed to Finance and Procurement Services, National Capital Commission, 40 Elgin Street, 3rd floor, Info Centre, Ottawa, Ontario K1P 1C7.

The name and address of the tenderer and the due time and date of the tender shall be clearly shown on the envelope.

2. Delivery of Tenders

Tenders must be received by the National Capital Commission on or before the exact time and date set for their reception. Care must be taken to mail or deliver tenders in good time as tenders received after the specified time and date will not be accepted or considered and will be returned unopened.

3. Unacceptable Tenders

Tenders not submitted on the accompanying Tender/Contract form.

Faxed tenders unless otherwise stated.

Tenders and amendments received after the tender closing date and time.

Incomplete tenders may be rejected.

Unsigned tenders shall be subject to disqualification.

In the event that security is required under these instructions and is not provided with the tender, the tender is subject to disqualification.

4. Revision of Tenders

The tenderer may revise his tender by fax, or letter provided it is received before the tender closing date and time.

Faxes, letters or telegrams must clearly indicate required changes.

5. Security Requirements

1. Security with Tender - In the event that security is required as indicated under section 2 of the Tender/Contract, the tender when submitted must be accompanied by the security in the amount as indicated.

2. Acceptable Security

i) A bid bond from a company acceptable to the National Capital Commission and in terms satisfactory to the National Capital Commission .

OR

ii) A certified cheque drawn on a bank to which the Bank Act or the Quebec Savings Bank Act applies, and made payable to the order of the National Capital Commission.

OR

iii) Bonds of the Government of Canada payable to bearer.

OR

iv) Cash

3. Upon notification of acceptance of tender :

1. If the tender is valued at less than $30,000.00 including taxes, the successful tenderer may be called upon by the Finance and Procurement Services to provide the security deposit as described in Clause 2 of the Tender/Contract.

2. If the tender is valued in excess of $30,000.00 including taxes, the successful tenderer shall be called upon by Procurement Services to provide the security as described in Clause 2 of the Tender/Contract.

6. Acceptance of Offer

The lowest or any tender not necessarily accepted.

7. Completion of Tender/Contract Form

Insert prices for units of measure and estimated quantities as shown on the Tender/Contract form or insert the lump sum of the tender in Clause 3.

If description, units of measure and estimated quantities are shown on the Tender/Contract form, insert the price per unit against each item, multiply by the respective estimated quantity, extend the answers to the Total column and add the Total column. Calculate the GST and QST (if applicable) on the total amount.

Type or legibly print the tenderer's full business name, address and telephone number under the spaces provided for the Contractor's Full Business Name and Contractor's Business Address respectively.

Sign the Tender/Contract form in the space provided as indicated below.

The tender must be signed by a duly authorizied signing officer of the Company in his/her normal signature designating against his/her signature the official capacity in which the signing officer acts. The corporate seal of the company must also be affixed to the tender.

Do not make any entry in the signature section marked for Commission use only.

8. Insurance

The Contractor shall maintain such insurance or pay such assessments as will protect him and the National Capital Commission from claims under the Worker's Compensation Acts and from any other claims for damages for personal injury including death, and from claims for property damage which may arise from his operations under this contract. Certificates of such insurance shall be filed with the National Capital Commission for protection. Such insurance certificates shall be maintained until the National Capital Commission certifies that the work is complete.

Liability insurance naming the National Capital Commission as co-insured shall be maintained by the Contractor for Public Liability and Property Damage in an amount of not less that $5,000,000.00. Insurance is to cover damage resulting from accident as well as negligence. A copy of the policy must be given to the National Capital Commission prior to commencing work.

NOTE: These Instructions need not be submitted with your tender.

9. Applications for Approval Certificates

Wherever materials are specified by trade names or by manufacturers' names, the tender shall be based on the use of such materials. During tendering period, alternative materials will be considered if full descriptive data are submitted in writing at least seven days before the tender closing date. Approval of submission will be signified by the issuance of an addendum to the tender documents.

GENERAL CONDITIONS

1. Definition of Terms

In the Contract,

1. the "Project Manager/Officer" means such person as may be specifically designated by or on behalf of the Chairman and/or Executive Vice-President and General Manager upon the award of this contract.
2. “work” includes the whole of the works, Labour and materials, matters and things to be done, furnished and performed by the Contractor under the contract.

2. Assignment and Subcontracting

This contract may not be assigned without the written consent of the Commission, and neither the whole nor any part of the work may be subcontracted by the Contractor without the consent of the Project Manager/Officer. Every subcontract shall incorporate all the terms and conditions of this contract which can reasonably be applied thereto.

3. Members of The House of Commons

No member of the House of Commons shall be admitted to any share or part of the contract or to any benefit arising therefrom.

4. Indemnification

The Contractor shall indemnify, and save harmless the National Capital Commission from and against all claims, losses, costs, damages, suits, proceedings, or actions arising out of or related to the Contractor’s activities in executing the work, other than those arising from a defect in title to the site of the work or the infringement of a patent arising from a design supplied by the National Capital Commission, but including his omissions improper acts or delays in executing the work under the contract.

5. Property of the National Capital Commission

The Contractor shall be responsible for any loss of or damage, excluding reasonable wear and tear, to any property of the National Capital Commission arising out of the performance of the work whether or not such loss arises from causes beyond his control. Such property shall only be used by the Contractor as may be directed by the Project Manager/Officer and the Contractor shall, at any time when requested to do so, account to the Project Manager/Officer for the use of such property.

6. Permits and By-Laws

The Contractor shall comply with all laws and regulations, relating to the work whether federal, provincial or municipal, as if the work was being constructed for a person other than the National Capital Commission and shall pay for all permits and certificates required in respect of the execution of the work.

7. Canadian Labour and Materials

Insofar as is practicable the Contractor shall employ and use Canadian labour and materials in the execution of the work and utilize the services of the Canada Manpower Centre in the recruitment of such labour.

8. Publicity

1. The Contractor will neither permit any public ceremony, nor erect or permit the erection of any sign or advertising, in connection with the work without the approval of the Project Manager/Officer.

2. All exterior signs erected by the contractor will be in both official languages and subject to NCC approval.

9. Materials, Equipment, etc. to become Property of the National Capital Commission

All materials and plants used or provided for the work shall be the property of the National Capital Commission, shall not be removed from the site of the work and shall be used only for the purpose of the work, until the Project Manager/Officer shall certify that they are, if not incorporated in the work, no longer required for the purpose of the work. The Contractor shall be liable for all loss or damage to materials or plants that are the property of the National Capital Commission by virtue of this section.

10. Contractor's Superintendent and Workers

The Contractor will keep a competent superintendent on the site of the work at all times during the progress of the work unless otherwise authorized by the Project Manager/Officer. The superintendent must be acceptable to the Project Manager/Officer and have the authority to receive on behalf of the Contractor any order or communication in respect of the contract. Any superintendent and workers not acceptable to the Project Manager/Officer because of incompetency, improper conduct or security risk will be removed from the site of the work and replaced forthwith.

11. Co-operation with other Contractors

The Contractor will co-operate fully with other contractors or workers sent onto the site of the work by the Project Manager/Officer. If the sending onto the work of other contractors and workers could not have been reasonably foreseen by the Contractor when entering into the contract, and if, in the opinion of the Project Manager/Officer the Contractor has incurred additional expense by such action, and if the Contractor has given written notice of claim within thirty days of such action, the National Capital Commission will pay the cost of such additional expense to the Contractor calculated in accordance with Section 20.

12. Claims Against and Obligations of the Contractor or Subcontractor

1. The Contractor shall ensure that all his lawful obligations and lawful claims against him arising out of the execution of the work are discharged and satisfied, at least as often as this contract requires the National Capital Commission to discharge its obligations to the Contractor and shall supply the Project Manager/Officer with a Statutory Declaration deposing to the existence and condition of such claims and obligations when called upon to do so.

2. The National Capital Commission may, in order to discharge lawful obligations and satisfy lawful claims against the Contractor or a subcontractor arising out of the execution of the work, pay any amount, which is due and payable to the Contractor under the contract and from a conversion or a negotiation of the security referred to in Section 18 hereof, if any, directly to the obligees of and the claimants against the Contractor or the subcontractor.

13. Project Manager/Officer's Rights and Obligations

The Project Manager/Officer shall:

1. have access to the work at all times during its execution and the Contractor will provide the Project Manager/Officer with full information and assistance in order that he may ensure that the work is executed in accordance with the contract;
2. decide any question as to whether anything has been done as required by the contract or as to what the Contractor is required by the contract to do, including questions as to the acceptability of, the quality or quantity of any labour, plant or material used in the execution of the work, and the timing and scheduling of the various phases of the work;
3. have the right to order additional work, dispense with, or change the whole or any part of the work provided for in the plans and specifications. The Project Manager/Officer shall decide whether anything done or not done as a result of directions given under this sub-section has increased or decreased the cost of the work to the Contractor and the amount payable under the contract to the Contractor will be increased or decreased accordingly by an amount calculated in accordance with Section 20 hereof.

The Contractor shall comply with any decision or direction of the Project Manager/Officer given under this section.

14. Delay, Non-compliance, or Default by the Contractor

If the Contractor delays in the commencement, execution or completion of the work, fails to comply with a direction or decision of the Project Manager/Officer properly given, or is in default in any other manner under the contract, the Project Manager/Officer may do such things as he deems necessary to correct the Contractor's default.

The Contractor will reimburse the National Capital Commission for all costs, expenses and damages incurred or sustained by the National Capital Commission, by reason of the Contractor's default, or in correcting the default. In addition to the aforementioned remedies in this section, the Commission may, if the default continues for 6 days after notice in writing of default has been given to the Contractor by the Project Manager/Officer, terminate the contract in accordance with Section 17.

15. Changes in soil conditions, National Capital Commission delays

1. The Contractor will receive no additional payment for additional costs incurred due to loss, damage or any other reason whatsoever, without the express certification of the Architect/Engineer that the additional cost, loss or damage is directly attributable to:

   i) in the case of a flat-rate contract, a significant difference between the soil condition information contained in the plans and specifications and actual on-site soil conditions;

   ii) negligence or delay on the part of the National Capital Commission, following the contract signing date, in providing complete information or in executing its full contract responsibilities or, according to current trade practice, the Contractor has submitted to the Architect/Engineer a written notice of claim for additional costs, loss or damages, not later than thirty (30) days following the date on which the varying soil conditions were noticed, or the date on which said negligence or delay commenced. The amount of any additional payments to be issued under this article will be calculated as per Article 20.

2. If, in the opinion of the Architect/Engineer, the Contractor has ensured a savings due to the differing soil conditions cited above, the amount of this savings will be deducted from the total price of the Contract stated in Article 1 of the Offer and Agreement.

16. Protesting Project Manager/Officer's Decision

If the Contractor, within 10 days of receiving any decision or direction of the Project Manager/Officer, gives written notice to the Project Manager/Officer that the decision or direction is accepted under protest, the National Capital Commission will pay to the Contractor the cost, calculated according to Section 20, of anything that the Contractor was required to do, as a result of the decision or direction, beyond what the contract correctly understood would have required him to do.

17. Suspension or Termination of the Contract

1. The Commission may upon notice in writing to the Contractor suspend or terminate the contract at any time. The Contractor will comply with such notice immediately.

2. If the Commission suspends the work for 30 days or less the Contractor must, subject to his remedy under Section 15 hereof, complete the work when called upon to do so. If the Commission suspends the work for a period in excess of 30 days the Contractor may request the Commission to terminate the work under sub-section 4 hereof.

3. If the Commission terminates the contract because of default by the Contractor, the insolvency of or the commission of an act of bankruptcy by the Contractor, the obligations of the National Capital Commission to make payments to the Contractor shall cease and no further payments shall be made to the Contractor or less the Project Manager/Officer shall certify that no financial prejudice will result to the National Capital Commission from such further payments. Termination under this sub-section shall not relieve the Contractor of any legal or contractual obligations other than the physical completion of the work. In such circumstances the Project Manager/Officer may complete or have the work completed as he sees fit and all costs and damages incurred by the National Capital Commission due to the non-completion of the work by the Contractor shall be payable by the Contractor to the National Capital Commission.

4. If the Commission terminates the work other than in accordance with sub-section 3 hereof, the National Capital Commission will pay to the Contractor an amount calculated in accordance with Section 20 hereof subject to any additions or deductions otherwise provided by the General Conditions or Labour Conditions less any payments made pursuant to Section 25.3, hereof. In no event, however, shall such amount be greater than the amount which would have been payable to the Contractor had the contract been completed.

18. Security Deposit

If any security deposit is provided by the Contractor pursuant to this contract it shall be dealt with in accordance with the Government Contracts Regulations, provided that if the Contractor is in breach or default under the contract the National Capital Commission may convert or negotiate such security to its own use. If a Labour and Material Payment Bond is provided pursuant to the contract the Contractor shall post on the site of the work a notice to that effect which shall include the name and address of the Surety, definition of those persons protected therein and an outline of the procedure for submitting a claim.

19. No Additional Payment

The amount payable to the Contractor under this contract will not be increased or decreased by reason of any increase or decrease in the cost of the work brought about by any increase or decrease in the cost of plant, labour or material, except that, in the event of a change in any tax, that affects the cost of any materials incorporated or to be incorporated in the work, imposed under the Excise Act, the Excise Tax Act, the Old Age Security Act, the Customs Act or Customs Tariff, made public after the date of the submission of the tender, an appropriate adjustment may be made.

20. Determination of Costs

For the purposes of Section 11, 13.3, 15, 16 and 17.4, the amount payable to the Contractor shall, subject to the provisions of Section 25.2.ii) hereof, be based on the unit prices, if any, set out in Clause 4 of the Offer and Agreement. If such unit prices are not applicable the Project Manager/Officer and the Contractor may mutually agree on the amount payable. Failing such agreement the amount payable shall be the reasonable and proper expenses paid or legally payable by the Contractor directly attributable to the work plus 10% of such expenses to cover overhead, including finance and interest charges, and profit, as certified by the Project Manager/Officer.

21. Records to be Kept by Contractor

1. The Contractor shall maintain full records of his estimates of and actual cost to him of the work together with all proper tender calls, quotations, contracts, correspondence, invoices, receipts and vouchers relating thereto, shall make them available to audit and inspection by the Commission, or by persons acting on its behalf, shall allow them to make copies thereof and to take extracts therefrom, and shall furnish them with any information which they may require from time to time in connection with such records.

2. The records maintained by the Contractor pursuant to this section shall be kept intact until the expiration of two years from the date of issuance of the Final Certificate of Completion under sub-section 24 of the General Conditions or until the expiration of such other period as the Commission may direct.

3. The Contractor shall require all subcontractors and all firms, corporations and persons directly or indirectly having control of the Contractor to comply with Sections 1 and 2 as if they were the Contractor.

22. Extension of Time

The Commission may, on the application of the Contractor, made before the day fixed for the completion of the work, extend the time for completion of the work. The Contractor shall pay to the National Capital Commission an amount equal to the National Capital Commission's expenses and damages incurred or suffered by reason of the delay in completion of the work unless in the opinion of the Commission such delay was due to causes beyond the control of the Contractor.

23. Cleaning of Work

The Contractor will upon completion of the work, clear and clean the work and its site to the satisfaction of and in accordance with any directions of the Project Manager/Officer.

24. Project Manager/Officer's Certificates

On the day that the work has been completed and the Contractor has complied with the contract and all orders and directions pursuant thereto to the satisfaction of the Project Manager/Officer, the Project Manager/Officer will issue to the Contractor a Final Certificate of Completion. In the case of a unit price contract, the Project Manager/Officer will at the same time issue a Final Certificate of Measurement setting out the final quantities used or employed in respect of the classes and units set out in the Unit Price Table, and any subsequent amendments thereto, under Clause 4 of the Offer and Agreement, such certificate to be binding upon the Contractor and the National Capital Commission.

25. Payment

1. The National Capital Commission will pay and the Contractor will accept as full consideration for the work performed and executed an amount by which the amount referred to in Clause 1 of the Offer and Agreement together with the aggregate of the amounts payable by the National Capital Commission under Section 11, 13.3, 15.1, 16 and 19 minus the aggregate of any payments by the National Capital Commission under Section 12 and indemnification and amounts payable to or costs and damages incurred by the National Capital Commission under Sections 4, 5, 9, 13.3, 14, 15.2, 17.3, 19 and 22.

2. In the case of a unit price contract:

   i) The amount referred to in Clause 1 of the Offer and Agreement will be deemed to be the amount computed by totalling the products of the unit prices set out in Clause 4 of the Offer and Agreement, as amended pursuant to sub-paragraph ii) hereof, if applicable, and the actual quantities of such units as set out in the Project Manager/Officer's Final Certificate of Measurement, subject to and, adjustment provided for in sub-paragraph ii) of this sub-section.

   ii) The Project Manager/Officer and the Contractor may, by agreement in writing, add to the aforesaid Unit Price Table other classes of labour, etc., units of measure, estimated quantities and prices per unit, and may if the actual quantities as set out in the aforesaid Final Certificate of Measurement exceed or fall short of the estimated quantities in respect of any item(s) shown in the aforesaid Unit Price Table by more than 15% amend the unit prices shown in the Unit Price Table for such items, provided that in the event the actual quantities exceed the estimated quantities by more than 15% the aforementioned amendment to the unit prices shall apply only to the actual quantities in excess of 115% of the estimated quantities. Where the Project Manager/Officer and the Contractor fail to agree on the amount of any adjustment as contemplated by this sub-section the revised or new prices per unit shall be determined in accordance with Section 20 hereof.

3. If the amount of the Contract is in excess of $5,000 the Contractor shall be entitled to receive progress payments upon submitting Progress Claims which must be approved by Progress Reports issued by the Project Manager/Officer at monthly intervals. The amount to be paid to the Contractor for a progress payment shall be 90% of the value of the work certified by the Project Manager/Officer in the Progress Report as having been completed since the date of the immediately preceding Process Claim, if any, when a Labour and Material Payment Bond has been furnished under the contract the amount to be paid under this sub-section shall be 95% of the value certified by the Project Manager/Officer.

4. Sixty (60) days after the issue by the Project Manager/Officer of the Final Certificate of Completion there shall become due and payable to the Contractor the amount described in sub-section 1 of this section less the aggregate of the amounts, if any, paid pursuant to sub-section 3 of this section.

5. Notwithstanding sub-sections 3 and 4 of this section, no payments shall be due or payable to the Contractor if he has failed to supply any Statutory Declaration pursuant to Section 12, surety bond or security deposit pursuant to Clause 5 of the Offer and Agreement.

6. A payment by the National Capital Commission pursuant to this section shall not be construed as evidence that the work is satisfactory or in accordance with the contract.

7. Delay in making a payment by the National Capital Commission under this section shall not be deemed to be breach of the contract. However, subject to sub-section 5 of this section, if payment of any Progress Claim under sub-section 3 of this section is not made within 60 days of the date of receipt of the Contractor's Progress Claim, such Progress Claim shall be deemed to be overdue and the Contractor shall be entitled to interest at the rate of 5% per annum of the amount overdue for the period commencing at the end of the forty-fourth day after the said date of receipt of the Progress Claim and ending on the date paid.

8. The National Capital Commission may set-off against any amount payable or debt due by the National Capital Commission under this contract the amount of any debt due to the National Capital Commission under this contract or any other contract between the Contractor and the National Capital Commission.

26. Correction of defects

Should the Contractor receive notice from the Architect/Engineer requiring the correction, at the Contractor's expense, of any defect or vice, regardless the cause, the Contractor will complete the necessary corrections on or before the deadline specified in said notice, in the event that the defect or vice becomes evident not later than twelve (12) months following the date of the Final Certificate of Completion.

27. Liability Insurance

The Constractor shall, at its own expense, purchase, provide and maintain in force for the duration of the contract comprehensive general public liability insurance, naming the Commission as co-insured, against claims for personal injury (including death) or property damage or public liability claims due to any accident or occurrence, arising out of or in connection with the execution of the contract, indemnifying and protecting the Commission to a limit of not less than two million ($5 000 000.00) per occurrence. There shall be no right of subrogation of the Constractor or the insurer and the policy of insurance shall contain a severability of interests clause. The Contractor shall provide the Commission with a copy of the certificate of insurance no less than five (5) days after the award of the contract. The Commission reserves the right to cancel the contract if the Commission does not receive the said certificate in which event the contract shall be null and void.

28. Workers Compensation

Successful construction project Contractors shall be required to provide evidence of compliance with workers' compensation legislation applicable to the place of the work including payments due thereunder, prior to award of the contract. Every successful construction project Contractor shall be required to provide evidence of such compliance at the time of submitting its first progress claim, at the time of substantial performance of the Work, and prior to issuance of the Certificate of Completion.

Occupational Health and Safety Requirements

1. General

1.1 In this Contract "OHS" means "occupational health and safety".

1.2 With respect to the work to be performed under the Contract, the Contractor covenants and agrees to perform at, and to enforce conformity with, a standard equivalent to or greater than the best practices prevailing in the construction industry at that time.

1.3 The Contractor acknowledges that, to the extent that the following matters may be affected by conduct of the work, it is responsible for the:

1.3.1 health and safety of persons on site;

1.3.2 safety of property on site;

1.3.3 protection of persons adjacent to the site; and,

1.3.4 protection of the environment.

1.4 Without limiting the generality of section 1.3, the Contractor acknowledges that it is required to, and covenants and agrees to, comply and to enforce compliance with all laws or regulations that may be applicable to the conduct of the work including, without limitation:

(a) the provisions of the *Occupational Health and Safety Act* of Ontario and all regulations, policies or directives issued thereunder for work performed in Ontario;

(b) La *Loi sur la santé et la sécurité du travail* of Québec and all regulations, policies or directives issued thereunder for work performed in Québec;

(c) Applicable provisions of the *Canada Labour Code, Part II;*

(d) Employment standards legislation in the province(s) in which any part of the work is performed; and

(e) Any policies or directives issued by the NCC in respect of the subject matter of the contract.

The NCC will present any such policies or directives referred to in paragraph (e) to the Contractor in written form by not later than the pre-construction meeting. The Contractor is obliged to ensure that the relevant policies and directives have been communicated to and acknowledged by all its employees and that they will be complied with. The NCC reserves the right to require the Contractor to produce evidence satisfactory to the NCC acting reasonably that the Contractor has discharged the foregoing obligations.

1.5 By entering into the Contract with the NCC, the Contractor represents and warrants to the NCC that it has informed itself of and is knowledgeable about the obligations imposed by the legislation referred to in 1.4. above.

1.6 For purposes of the relevant provincial OHS legislative regime the Contractor acknowledges and agrees that it is the "Constructor" and covenants to discharge and accept all liability for the performance of the obligations of the "Constructor" in respect of the work provided for in the Contract. Notwithstanding a determination by the relevant authority having jurisdiction that the NCC is the "Constructor" in the event of a dispute between the Contractor and the NCC, the

Contractor acknowledges and agrees that the Contractor shall be financially responsible for the implementation of protective measures necessary to fulfill the obligations of the "Constructor".

1.7 As between the NCC and the Contractor, the NCC's decision as to whether the Contractor is discharging its obligations in respect of OHS issues shall be definitive. Without limiting the generality of the foregoing, in the event of any dispute with respect to instructions given by the NCC's designated representative, the Contractor may note such dispute, but must nevertheless forthwith comply with any such instructions.

1.8 The Contractor hereby indemnifies and agrees to hold harmless the NCC, its agents and employees, from and against any and all claims, demands, losses, costs (including legal fees on a full indemnity basis), damages, actions, suits or proceedings (hereinafter collectively referred to as "claims") by third parties that arise out of or are attributable to the Contractor's errors or omissions in the performance of the Contract. Without limiting the generality of the foregoing, this indemnification extends to any claims related to any violation of any statute or regulation relating to OHS matters.

1.9 The NCC shall provide the contractor:

1.9.1 a written description of every known and foreseeable health and safety hazard to which persons employed in the performance of the work may be exposed because of the nature of the site;

1.9.2 a list of any prescribed materials, equipment, devices and clothing necessary because of the nature of the site;

1.9.3 with written information indicating the prescribed circumstances and manner to use all prescribed materials, equipment, devices and clothing listed pursuant to 1.9.2; and,

1.9.4 with a copy of any NCC policies and procedures that may be applicable in relation to the work site.

1.10 Without limiting the generality of 1.9, prior to the commencement of the work by the contractor, the contractor shall, at the contractor's expense:

1.10.1 take all reasonable care to ensure that all persons employed in the performance of the work or granted access to the work or its site are informed of any health and safety hazard described pursuant to 1.9.1;

1.10.2 provide all persons employed in the performance of the work or granted access to the work or its site with prescribed materials, equipment, devices and clothing listed pursuant to 1.9.2;

1.10.3 take all reasonable care to ensure that all persons employed in the performance of the work or granted access to the work or its site are familiar with the prescribed circumstances and manner all prescribed materials, equipment, devices and clothing listed pursuant to 1.9.2; and

1.10.4 take all reasonable care to ensure that all persons employed in the performance of the work or granted access to the work or its site are familiar with policies and procedures referred to in 1.9.4.

2. Qualifications of Personnel

2.1 By entering into this agreement the contractor represents and warrants the it has the requisite experience, training, formal certification and equipment to enable it to discharge the obligations enumerated in sections 1.3. 1.4, 1.5 and 1.6 above.

2.2 The Contractor represents and warrants that supervisory personnel employed by the Contractor in respect of performance of any part of the work have the requisite experience, authority, training, formal certification and equipment to ensure that the obligations enumerated in sections 1.3 1.4, 1.5 and 1.6 above are discharged and agrees to deliver such evidence as may be required by the NCC from time to time to verify same.

3. Certification

3.1 After receiving notification that its bid has been retained and prior to and as a condition of contract award, the Contractor covenants and agrees to deliver a Worker's Compensation Clearance Certificate. Where the duration of the project is greater than sixty days, the Contractor covenants and agrees to deliver up-dated certificates at least every 60 days. In the event of a failure by the Contractor to deliver up-dated certificates, the NCC shall be entitled to immediately terminate the contract without notice and without incurring any liability to the Contractor.

3.2 After receiving notification that its bid has been retained and prior to and as a condition of contract award, the Contractor covenants and agrees to deliver historical information on its injury experience including any pertinent Worker's Compensation Experience Reports. Such historical information shall report data for the previous three years.

4. Plans Policies and Procedures

4.1 After receiving notification that its bid has been retained and prior to and as a condition of contract award, the Contractor covenants and agrees to deliver for the review and approval of the NCC:

(a) A copy of the contractor's OHS policy;

(b) A safety program and plan specific to the work to be performed pursuant to the Contract which plan shall include a risk assessment and analysis, a description of safe working methods, injury and incident reporting protocols, regular periodic reporting on compliance with OHS obligations including any policies, practices and procedures otherwise provided for herein, and a site-specific contingency and emergency response plan; and

(c) Health and safety training records of personnel and alternates responsible for OHS issues on site.

The Contractor covenants and agrees to deliver the necessary material safety data sheets for the review and approval of the NCC prior to entering the site to perform work related to the relevant material.

Approval by the NCC does not amend the provisions of the Contract with respect to the allocation of liability for discharging or failing to discharge OHS obligations. Such liability remains with the Contractor notwithstanding the granting of such approval.

4.2 The Contractor acknowledges and agrees that prior to commencement of work it must attend a pre-construction briefing at which any special or additional practices and procedures to be followed in completing the work are to be established. Without limiting the provisions of section 1.4(e) above, the representatives of the Contractor attending the briefing will be required to deliver

a signed acknowledgement that the practices and procedures set out in the pre-construction briefing have been understood and will be complied with.

4.3 At any time and from time to time during the performance of the work, the NCC shall have the right to audit the manner in which the Contractor is discharging its OHS obligations and to determine whether the project specification and/or OHS policies, practices and procedures are being complied with. In the event that the audit discloses any failure by the Contractor to discharge such OHS obligations , the NCC shall be entitled to forthwith rectify at the Contractor's expense any such deficiency and the NCC shall have the further right to immediately terminate the contract without notice and without incurring any liability to the Contractor.

4.4 The Contractor covenants and agrees to conform with all requirements of the Workplace Hazardous Materials Information System.

4.5 The Contractor acknowledges and agrees that where required by any law or regulation applicable to the performance of the work it must establish and maintain a project health and safety committee. The contractor further acknowledges and agrees that it must enable staff to attend all relevant safety meetings, and that the cost of same, including costs attributable to standing down equipment is included in its bid price and is not independently recoverable.

4.6 Where required by the relevant provincial regulatory regime, the Contractor acknowledges and agrees that it is responsible for delivery of notice of the project to the relevant regulatory authority, and for the performance of any other administrative activity required to meet the obligations imposed in the pertinent provincial regulatory regime.

4.7 **(Optional depending on hazard or scope of project)**. The contractor covenants and agrees that it shall employ and assign to the work, a competent OHS professional as Health and Safety Coordinator that must:

(a) have a minimum two (2) years' site-related working experience specific to activities associated with.(identify specific subject matter)

(b) have basic working knowledge of specified occupational safety and health regulations,

(c) be responsible for completing health and safety training session and ensuring that personnel not successfully completing the required training are not permitted to enter the site to perform the Work,

(d) be responsible for implementing, enforcing daily and monitoring the site-specific Health and Safety Plan, and

(e) be on site during execution of the Work.

The parties acknowledge that in lieu of employing an OHS professional, the Contractor may provide same by sub-contracting for such services.

4.8 Upon completion of the work the Contractor covenants and agrees to participate with the NCC in a post performance interview to evaluate the performance of the Contractor in respect of the OHS obligations under the contract. Without limiting the generality of the foregoing, the interview will identify areas of compliance and non-compliance in terms of:

(a) actual performance of the work;

(b) reporting or procedural requirements;

(c) resolution of deficiencies.

The contractor acknowledges and agrees that the results of the post-completion interview may be relied upon by the NCC in evaluating bids subsequently submitted by the Contractor on other NCC projects.

SECURITY REQUIREMENTS

Security Requirements

The NCC complies with Treasury Board's *Policy on Government Security* and consequently, it will require that the Contractor's employees submit to a personal security screening process (Security Clearance Form TBS/SCT 330-60E). The NCC may also perform a credit check when the duties or tasks to be performed require it or in the event of a criminal record containing a charge/offence of a financial nature.

The NCC reserves the right to not award the Contract until such time as the Contractor's core employees have obtained the required level of security screening as identified by the NCC's Corporate Security. In this case the level of security required will be **Reliability/Site Access/Secret**.

The NCC also reserves the right to request that the Contractor submit to a *Designated Organisation Screening* and/or *Facility Security Clearance*– depending on the nature of the information it will be entrusted with. In the event that the Contractor does not meet the requirements to obtain the requested clearance, the Contractor shall take the corrective measures recommended by the Canadian Industrial Security Directorate (of PWGSC) or by the NCC's Corporate Security in order to meet these requirements. If no corrective measures are possible or if the Contractor fails to take the recommended measures, then the Contractor shall be in default of its obligations under this Contract and the NCC shall have the rights and remedies listed in section 2.14, including the right to terminate the Contract without further notice to the Contractor.

Additional information

As part of their personal screening, individuals may be required to provide evidence of their status as a Canadian citizen or permanent resident as well as any other information/documentation requested by the NCC's Corporate Security in order to complete the screening.

The NCC reserves the right to refuse access to personnel who fail to obtain the required level of security screening.

The NCC reserves the right to impose additional security measures with respect to this Contract as the need arises.

Company Security Representative

The Contractor shall appoint one Company Security Representative (CSR) as well as one alternate (for companies who have more than five employees).

Selection criteria for the CSR and the alternate are the following:

- They must be employees of the Contractor;

- They must have a security clearance (the NCC will process the clearances once the individuals have been identified).

Responsibilities of the Company Security Representative

The CSR's responsibilities are the following:

- Act as liaison between the NCC's Corporate Security and the Contractor to ensure coordination;
- In collaboration with the NCC's Corporate Security, identify the Contractor's employees who will require access to NCC information/assets/sites **as well as any recurring subcontractors** (and their employees) who will require similar access and may not be supervised by the Contractor at all times during such access. Ensure that accurate and complete Personnel Security Screening documentation is submitted to the NCC's Corporate Security for the employees/subcontractors who have been identified;
- Ensure that employees/subcontractors, upon notification of having been granted a reliability status, sign the *Security Screening Certificate and Briefing Form* and return to the NCC's Corporate Security;
- Ensure that only persons who have been security screened to the appropriate level and who are on a "need-to-know basis" will have access to information and assets;
- Maintain a current list of security screened employees/subcontractors;
- Ensure proper safeguard of all information and assets, including any information/assets entrusted to subcontractors;
- If a Security incident or suspected breach of security occurs, prepare and submit to the NCC an occurrence report as soon as possible.

NCC CCN Canada

☐ New supplier Nouveau fournisseur
☐ Update / Mise à jour

Supplier No. / No du fournisseur

For NCC use only / À l'usage de la CCN seulement

SUPPLIER – DIRECT PAYMENT AND TAX INFORMATION FORM
FOURNISSEUR – FORMULAIRE DE PAIEMENT DIRECT ET RENSEIGNEMENTS POUR FINS D'IMPÔT

PART 'A' – IDENTIFICATION / PARTIE 'A' - IDENTIFICATION

Legal name of entity or individual / Nom légal de l'entité ou du particulier	Operating name of entity or individual (if different from Legal Name) / Nom commercial de l'entité ou du particulier (s'il diffère du nom légal)

Former Public Servant in receipt of a PSSA Pension / Ancien fonctionnaire qui reçoit une pension en vertu de la LPFP	☐ **Yes / Oui**	☐ **No / Non**
An entity, incorporated or sole proprietorship, which was created by a Former Public Servant in receipt of a PSSA pension or a partnership made of former public servants in receipt of PSSA pension or where the affected individual has a controlling or major interest in the entity. / Une entité, constituée en société ou à propriétaire unique, créée par un ancien fonctionnaire touchant une pension en vertu de la LPFP, ou un partenariat formé d'anciens fonctionnaires touchant une pension en vertu de la LPFP, ou les entités dans lesquelles ils détiennent le contrôle ou un intérêt majoritaire.	☐ **Yes / Oui**	☐ **No / Non**

Address / Adresse	Telephone no. / No. de □elephone :	Fax no. / No. De télécopieur :
Postal code / Code postal	( )	( )

PART 'B' – STATUS OF SUPPLIER / PARTIE 'B' – STATUT DU FOURNISSEUR

(1) Sole proprietor / Propriétaire unique ☐ — If sole proprietor, provide / Si propriétaire unique, indiquez : Last Name / Nom de famille | First name / Prénom | Initial / Initiale

(2) Partnership / Société de personnes ☐ — SIN – mandatory for (1) & (2) / NAS – obligatoire pour (1) & (2)

Corporation /Société ☐ — Business No. (BN) / No de l'entreprise (NE)

GST/HST / TPS et de TVH	QST / TVQ (Québec)
Number / Numéro :	Number / Numéro :
Not registered / non inscrit ☐	Not registered / non inscrit ☐

Type of contract / Genre de contrat

Contract for services only / Contrat de services seulement ☐ — Contract for mixed goods & services / Contrat de biens et services ☐ — Contract for goods only /Contrat de biens seulement ☐

Type of goods and/or services offered / Genre de biens et/ou services rendus :

PART 'C' – FINANCIAL INSTITUTION / PARTIE 'C' – RENSEIGNEMENTS SUR L'INSTITUTION FINANCIÈRE

Please send a void cheque with this form / Veuillez, s.v.p., envoyer un spécimen de chèque avec ce formulaire

Branch number / No de la succursale _____ Institution no. / No de l'institution : _____ Account no. / No de compte : _____

Institution name / Nom de l'institution : _____ Address / Adresse : _____

Postal Code / Code postal : _____

PART 'D' – PAYMENT NOTIFICATION / PARTIE 'D' – AVIS DE PAIEMENT

E-mail address / Adresse courriel :

PART 'E' – CERTIFICATION / PARTIE 'E' – CERTIFICATION

I certify that I have examined the information provided above and it is correct and complete, and fully discloses the identification of this supplier.

Where the supplier identified on this form completes part C, he hereby requests and authorizes the National Capital Commission to directly deposit into the bank account identified in part C, all amounts payable to the supplier.

Je déclare avoir examiné les renseignements susmentionnés et j'atteste qu'ils sont exacts et constituent une description complète, claire et véridique de l'identité de ce fournisseur.

Lorsque le fournisseur indiqué sur ce formulaire remplit la partie C, par la présente il demande et autorise la Commission de la capitale nationale à déposer directement dans le compte bancaire indiqué à la partie C, tous les montants qui lui sont dus.

Name of authorized person / Nom de la personne autorisée _____ Title / Titre _____ Signature _____ Date _____

Telephone number of contact person / Numéro de téléphone de la personne ressource : ( )

IMPORTANT

Please fill in and return to the National Capital Commission with one of <u>your business cheque unsigned and marked « VOID</u> » (for verification purposes).

Mail or fax to : Procurement Assistant, Procurement Services
National Capital Commission
202-40 Elgin Street
Ottawa, ON K1P 1C7 Fax : (613) 239-5007

Veuillez remplir ce formulaire et le retourner à la Commission de la capitale nationale avec <u>un spécimen de chèque de votre entreprise non signé et portant la mention « ANNULÉ</u> » (à des fins de vérification).

Poster ou télécopier à : Assistant à l'approvisionnement
Services de l'approvisionnement
Commission de la capitale nationale
40, rue Elgin, pièce 202
Ottawa (Ontario) K1P 1C7 Télécopieur : (613) 239-5007

SUPPLIER – DIRECT PAYMENT AND TAX INFORMATION FORM

FOURNISSEUR – FORMULAIRE DE PAIEMENT DIRECT ET RENSEIGNEMENTS AUX FINS D'IMPÔT

Supplier Tax Information

Pursuant to paragraph 221(1) (d) of the Income Tax Act, NCC must declare form T-1204, contractual payments of government for services, all payments made to suppliers during the calendar year in accordance to related service contracts (including contracts for mixed goods and services).

The paragraph 237(1) of the Income Tax Act and the article 235 of the Income Tax Regulations require the supplier to provide all necessary information below to the organization who prepares the fiscal information forms.

Questions : Marcel Sanscartier, Manager, Accounts Payable and Receivable – (613) 239-5241.

Direct payment information

All amounts payable by NCC to the supplier will be deposited directly into the account you identified in part C. A NCC payment advice notice will also be sent to you by e-mail detailing the particularities of the payment.

Until we process your completed form, we will still pay you by check.

You must notify the NCC of any changes to your financial institution, branch or account number. You will then have to complete a new form.

The account you identified has to hold Canadian funds at a financial institution in Canada.

The advantages of direct payment

Direct payment is a convenient, dependable and timesaving way to receive your invoice payment. Direct payment is completely confidential.

There is less risk of direct payment being lost, stolen, or damaged as may happen with cheques.

Funds made by direct payment will be available in your bank account on the same day that we would have mailed your cheque.

Renseignements sur les fournisseurs aux fins d'impôt

En vertu de l'alinéa 221(1) (d) de la Loi de l'impôt sur le revenu, la CCN est tenu de déclarer, à l'aide du formulaire T-1204, Paiements contractuels de services du gouvernement, tous paiements versés aux fournisseurs pendant une année civile en vertu de marchés de services pertinents (y compris les marchés composés à la fois de biens et de services).

Le paragraphe 237 (1) de la Loi de l'impôt sur le revenu et l'article 235 du Règlement de l'impôt sur le revenu obligent les fournisseurs à fournir toutes les informations demandées ci-dessous à l'organisme qui prépare les formulaires de renseignements fiscaux.

Questions : Marcel Sanscartier, Gestionnaire, comptes fournisseurs et comptes clients – (613) 239-5241.

Renseignements sur le paiement direct

Tous les montants versés par la CCN au fournisseur seront déposés directement dans le compte identifié à la partie C. Un avis de paiement de la CCN détaillant les particularités du paiement vous sera envoyé par courriel.

Nous continuerons à vous payer par chèque jusqu'à ce que nous ayons traité votre formulaire.

Vous devez aviser la CCN de tout changement d'institution financière, de succursale ou de numéro de compte. Vous devrez donc remplir un nouveau formulaire.

Le compte que vous désignez doit être un compte en monnaie canadienne, détenu dans une institution financière au Canada.

Avantages du paiement direct

Le paiement direct est une méthode pratique, fiable, qui permet de gagner du temps dans la réception de vos paiements de factures. Le paiement direct est entièrement confidentiel.

Avec les paiements direct, il y a moins de risques de perte, de vol ou de dommage, comme cela peut se produire dans le cas des chèques.

Les paiements effectués par paiement direct sont versés dans votre compte le jour même où nous aurions posté votre chèque.

Revised November 2012