

HercuLine® 2000 Series Actuators

Specification

General Overview



Honeywell's HercuLine® 2000 Series are high reliability, precision electric actuators with many easy-to-use benefits.

HercuLine™ actuators are industrial rated and engineered for very precise positioning of dampers and valves. They perform especially well in extremely demanding environments requiring continuous duty, high reliability, and low maintenance.

HercuLine™ 2000 actuators are used in power to open/close, position proportional (PAT), or 3-position step applications.

HercuLine™ 2001 and 2002 Smart actuators are used in current proportional (CAT), digital remote set-point, or series 90 control applications.

HercuLine™ 2002 actuators offer premium features such as non-contact position sensing and slidewire emulation output for extremely demanding current proportional applications.

Overview of HercuLine 2001 & 2002 Features

Factory Calibration is stored in non-volatile memory for easy restoration.

Password protection to prevent accidental tampering.

RS485/Modbus RTU communication is standard.

Characterization – linear, equal percentage, quick opening, or user configured 20-point.

Failsafe functions enable the actuator to drive to a user specified position on loss of input signal or loss of position sensor.

Split range operation is programmable and infinitely adjustable.

Digital Input enables the actuator to drive to a user specified position on a contact closure.

Stall Alarm provides an alarm output in the event of actuator stall due to overload.

Direction of rotation is easily changed without re-calibration.

Input Filters are programmable low pass and spike.

Health Monitoring: data on the operation of the actuator is collected and stored in non-volatile memory for access by the user or 3rd party predictive maintenance programs to predict failures.

Smart Options

HercuLink™ software enables remote configuration, calibration or control using a PALM PDA.

Maintenance data can be downloaded to your PC and stored configurations may be uploaded and downloaded to/from the PDA and device.

Local HMI configuration is an optional keypad and high intensity LED display.

Auxiliary Relay Outputs are SPDT and may be programmed to indicate alarm status, control other equipment, or to indicate position.

Battery Powered 232/485 converter and cable is used to connect the Palm PDA to the HercuLine actuator for communication.

Alarm Functions – Alarms may be assigned to relay outputs or may be accessed through the Modbus network.

Non-Contact Position Sensing

Standard in the HercuLine 2002 actuator, the technology is a variable inductance, non-contact position sensor mounted directly to the actuator output shaft to provide precision position sensing without hysteresis. This technology eliminates maintenance associated with slidewire position feedback devices.

Typically used in very demanding applications where downtime is not an option.

Slidewire Emulation

Available in the HercuLine 2001 and 2002 actuator, the Slidewire Emulation Circuit (SEC) emulates the proportional voltage output of a typical slidewire, providing a voltage output that is proportional to the supply voltage and shaft position.

Shaft position is determined using a non-contact position sensor.

Typically used in very demanding applications where downtime is not an option and where Position Adjust (PAT) control is desired.

Potentiometer Shaft Sensing

Available in the HercuLine 2000 and 2001, the 1000 ohm film potentiometer duplicates the function of a slidewire but with higher resolution and less maintenance than a slidewire.

Self-locking/releasing Gear Train

The gear train is a combination spur and worm gears. The worm gear output combination is self-locking and self-releasing and maintains position upon loss of power. It is designed to hold greater than two times the rated output torque in a back-driving condition.

This design provides superior reliability without the maintenance associated with other self-locking mechanisms and brake mechanisms.

General Features

Motor – continuous duty synchronous motor with no burn out and almost instant stop/start characteristics for reliable and precision actuation.

Any position mounting – the actuator may be mounted in any orientation without degrading performance.

Power Requirements – Low power consumption 120/240 Vac, 50/60 Hz, single phase.

Enclosure – Rugged, Die cast epoxy powder coated aluminum.

Low Maintenance – Simple-proven design means high reliability/low maintenance.

Limit Switches – Two end-of-travel electric limit switches are supplied as standard equipment with all HercuLine 2000 series actuators. Optional auxiliary switches are available.

Warranty – 18 months

Certification – CSA, UL, CE, NEMA 4/IP67

General Options

Auxiliary Switches – up to four additional SPDT switches are available.

Manual Operation – a manual handwheel is optional and used to operate the actuator when power is not available.

Auto-Manual – electric handswitch with auxiliary contacts indicating an "Out-of-Auto" position is available for local electric control.

Competitive Mounting Plates – to adapt the HercuLine actuators to Invensys (Barber-Colman) or Siemens (Landis & Staefa) mountings.

Linkage assemblies – PushRod assemblies for valve or damper connection.

Remote mount R7195A/B controller – used with HercuLine 2000 to duplicate the M940A Actionator configuration.

Optional Local Display and Keypad for HercuLine 2001 and 2002

A local display and keypad is optional for configuration and set-up (Figure 1). A high intensity 10-character LED display and simple push buttons provide quick access for actuator set up and status information. If relay outputs are specified, all configurations can be done through either the local HMI interface or the HercuLink configurator. HercuLink Palm PDA software is available for those ordering units without the display and keypad.

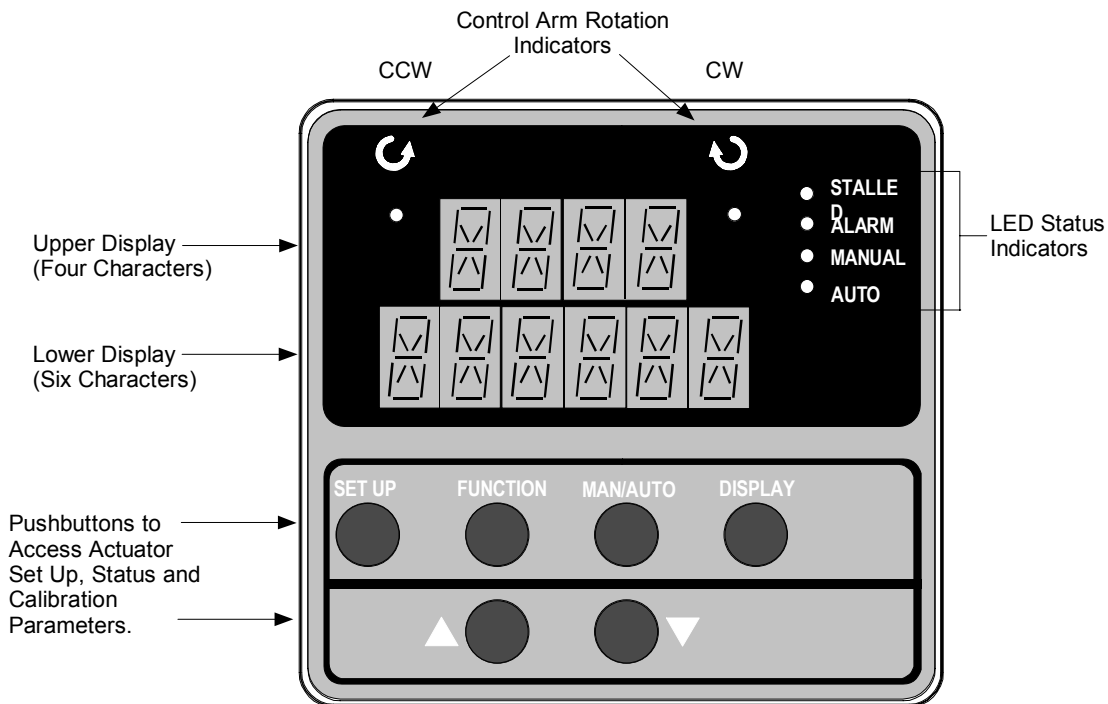


Figure 1 Local HMI (Display and Keypad)

Non-Contact Sensor

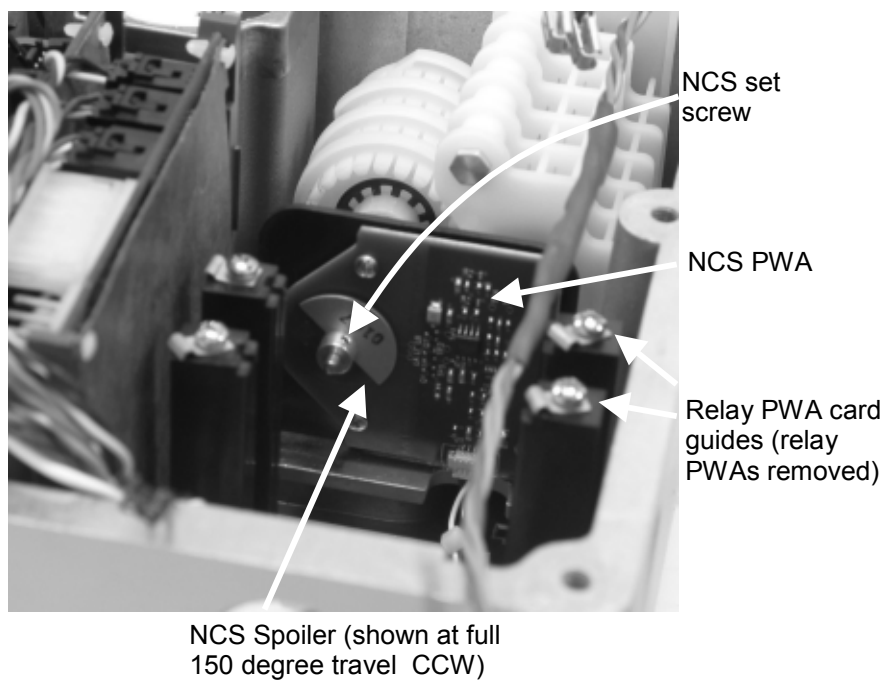


Figure 2 Non-Contact Sensor Assembly (HercuLine 2002)

HercuLink PDA Interface

HercuLink™ PDA software enables access to programming and communication functions available as standard with the HercuLine 2001 and 2002 actuators without the added expense of the keypad & display HMI. By using a Palm™ PDA running HercuLink™ software, connected to the actuator with Palm™ serial cable and a RS232/485 converter, users may configure, calibrate, and access maintenance information locally or remotely to the actuator. (Note: Palm™ cable with split serial/USB connector is not compatible. Serial cable available from Palm.)

Using HercuLink software the PDA may be used as a master device over a Modbus network to access information to/from the actuators and to control the device. Set-up configurations may also be stored on the PDA for download to other HercuLine devices. Information stored on the PDA device may also be downloaded to the users PC in CSV format for use in preventative maintenance programs.

Certified on Palm™ m125, m130 and m505.

Compatible with Palm OS3.5 or higher.

Minimum system requirements:

Windows 2000 (w/service pack 2), Windows NT (w/service pack 5), Windows ME

200 Mhz Pentium with 64 Megs Ram

Palm™ is a trademark of Palm, Inc.

HotSync® is a registered trademark of Palm Computing, Inc.

HercuLink is a trademark of Honeywell

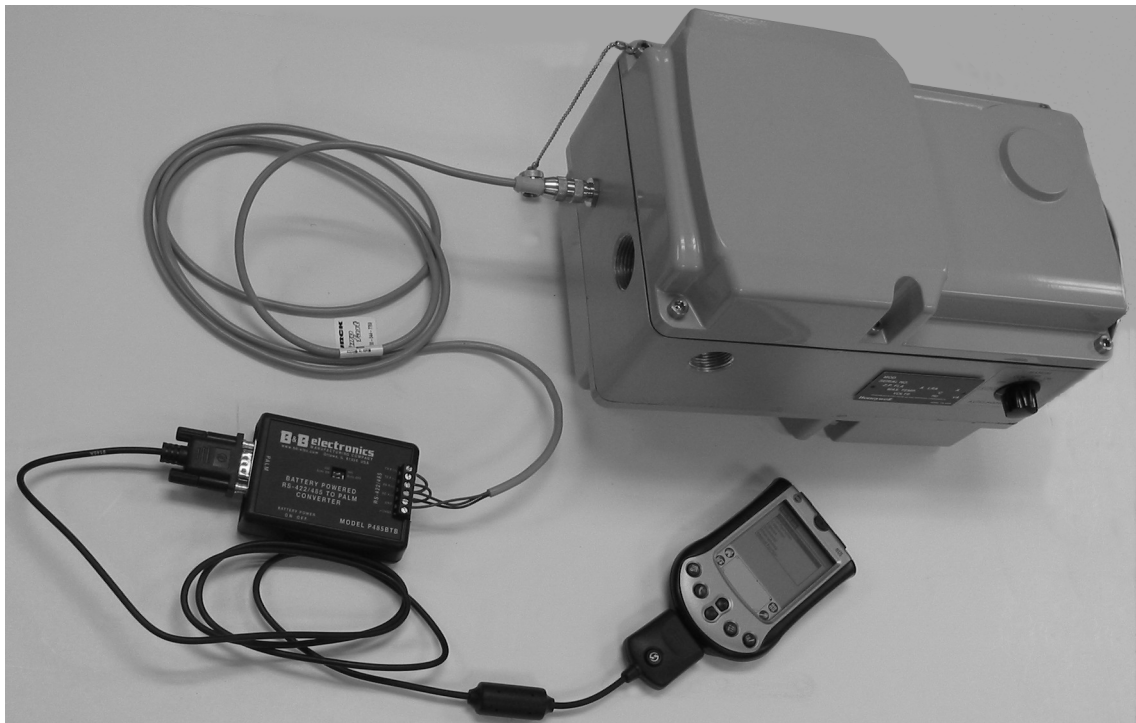


Figure 3 PDA connection

Set Up/Configuration Parameters for Keypad & Display or HercuLink™ Software

Configuration parameters are logically grouped and accessed using the local HMI. Actuator calibration is also accomplished through a simple procedure using the keypad. By pressing the SETUP button on the HMI, you can step through the set up groups that contain all of the configuration parameters. The table below summarizes the configuration parameters available within the various set up groups. Full details of all configuration parameters are found in the *HercuLine 2000 Series Actuator Installation, Operation and Maintenance Manual*, document number 62-86-25-10.

Set Up Group	Configuration Parameter Selections/Settings	
SET INPUT — Selects various parameters that define actuator operation.	IN TYP – Input Actuation Type INP HI – Input High Range Value INP LO – Input Low Range Value FILTYP – Input Filter Type LPFILT – Low Pass Filter Time Constant Direct – Actuator Rotation	Dband – Input Deadband FsTYP – Failsafe Type FsVAL – Failsafe Value CHAR – Input Characterization Type CUST – Custom Characterization Type
SET RELAY — When the actuator is equipped with optional relays, this set up group allows you to set relay action for various actuator operating conditions. Contact closure can be wired to external annunciators or alarm points to indicate conditions for any of the RelayTypes.	RTYPnn – Relay Type Input Range Position Range Deviation Upper or Lower Limit Travel Temperature High or Low Cycle Count Motor Stalled Manual Mode Power Up Test Failure Input Signal Failure Position Sensor Signal Failure Digital Input Closure Total Degrees Traveled	RnnVAL – Relay Value Rnn HL – Relay High/Low RLYnHY – Relay Hysteresis
SET CUREOUT — Selects the current (or voltage) output range of the actuator.	CUREOUT - Output Signal Range 4 – 20 mA 0 – 20 mA 1 – 5 V 0 – 5 V	Or SWE
SET COMM — Actuator can be defined as a master or slave device on a Modbus RTU RS-485 loop. Operating setpoint can be transmitted to the actuator and operating status can be read when connected to supervisory control systems.	COMM – Communications Parameters ADDRES – Device Address BAUD – Baud Rate XmtDLY – Response Delay DBLBYT – Floating Point Data Format	
SET DIGINP — Selects digital input action upon contact closure.	DIGINP – Digital Input State Endpos – End Position Value	
SET DISPLA — Selects desired decimal places and engineering units for local display	DECMAL – Decimal Point Location EUNITS – Units Display UNITS – Display Units	
CAL INPUT, MTR, CURENT — If needed, field calibration of the actuator input, motor position and actuator output can be performed using the local keypad and display.		

Set Up Group	Configuration Parameter Selections/Settings	
SET LOCK — Enables lock out or access to selected set up group parameters and calibration values.	LOCKID – Set Security Password LOCK – Lock Out MAENAB – Mode button lockout	
READ STATUS — Displays failsafe condition and the results of various diagnostics performed during power up.	FAILSF – Failsafe RAMTST – RAM Test Diagnostic SEETST – Serial EEPROM Test Diagnostic	CFGTST – Configuration Test Diagnostic CALTST – Calibration Test Diagnostic
SET DRVINF — Allows access to actuator device information.	VERSION – Firmware Version SPEED – Stroke Speed POWER – Power Input Voltage and Line Frequency TAG – Tag Name	MFGDAT – Manufacturing Date LREP – Date of Last Repair LCAL – Date of Last Field Calibration REPTYP – Repair Type
SET MAINT — Allows access to parameters that monitor operating conditions.	TEMP – Actuator Temperature TEMPHI – High Temperature Limit TEMPLO – Low Temperature Limit ACSTAL – Accumulated Stall Time STARTS – Accumulated Motor Starts RLnCNTS – Relay Cycle Counts	REGNn – Accumulated Motor Starts TOTDEG – Total degrees traveled MANRST – Reset Maintenance Statistics LD CAL – Restore Calibration LD CFG – Restore Configuration SYSRST – System Restart

Specifications – General

Physical					
Weight	2000: 25 lb. (11.36 kg) 2001,2002: 27 lbs. (12.27 kg)				
Enclosure	Precision-machined die cast aluminum housing, finished in light gray powder coat epoxy.				
Gear Train	Alloy steel, high efficiency steel spur gear primary train. Precision ground, self-locking/self releasing worm gear final mesh.				
Mechanical Stops	Factory set at 90° or 150° (+/-5°) adjustable.				
Storage Temperature	–40 °C to +93 °C (–40 °C to +200 °F)				
Relative Humidity	0 % to 99 % R.H. non-condensing over the full operating temperature range.				
Scale	0 % to 100 % corresponding to full crank arm travel.				
Crank Arm	Adjustable radii 1.0 in (25.4mm) to a maximum of 2.8 in (71.1mm). Position adjustable through 360° rotation.				
Output Shaft	0.625+/-0.005 in (15.88 +/-0.13mm) diameter				
Rotation	90° or 150° degrees between 0 % and 100 % on scale, limited by mechanical stops.				
Manual Handwheel (optional)	Provides a means of positioning the actuator in the event of a power failure or set-up.				
Lubrication	Texaco Starplex 2 EP Grease				
Output Torque/Full Travel Stroking Time		Torque In-lb	N-M	Output Shaft Speed sec/150° @ 60Hz	@ 50Hz
		50	6.0	6	7.5
		100	11.5	12	15
		200	23	25	30
		400	46	50	60
		400	46	75	90

Electrical	
Mains Supply	100-130 Vac single phase, 50 Hz or 60 Hz 200-240 Vac single phase, 50 Hz or 60 Hz
Motor	Instant start/stop, non-coasting, non-burnout, continuous duty, permanent magnet, synchronous induction motor. Can be stalled up to 100 hours without damage.
Motor Current	= No load = full load = locked rotor = 0.4 amp for 120Vac, 0.2 amp for 240 Vac
Loss of Power	Stays in place on loss of power
Local Auto/Manual Switch	Optional – Allows local and automatic operation of the actuator.
End of travel Limit Switches	Standard – Two SPDT end of travel limits.
Auxiliary Switches/Relays	Optional – Up to 4 additional SPDT switches rated at (10 A at 125 Vac, 5 A at 250 Vac).
Certifications	
Approvals	CSA/UL (Standard) CE Compliant (optional)
Enclosure Rating	NEMA type 4 and IP66 (standard)
Torque Settings of Crank Arm Bolts	
Clamp Bolt	88 lb-in (10 N-m)

Electrical and Performance Specifications HercuLine 2000 Series

	HercuLine 2002	HercuLine 2001	HercuLine 2000
Input Signals	Analog: <ul style="list-style-type: none"> 0/4 to 20 mA (With CPU PWA jumper in current position) 0/1 to 5 Vdc 0 to 10 Vdc Digital: <ul style="list-style-type: none"> Modbus RTU (RS485) 	Analog: <ul style="list-style-type: none"> 0/4 to 20 mA (With CPU PWA jumper in current position) 0/1 to 5 Vdc 0 to 10 Vdc Series 90 control Digital: <ul style="list-style-type: none"> Modbus RTU (RS485) 	120 vac drive open/120 vac drive close 240 vac drive open/120 vac drive close
Isolation	Input signal, output signal and power are isolated from each other.		NA
Load Requirement (4-20)	Current Out — 0 to 1000 ohms		NA
Input Impedance	0/4 to 20 mA 0/1 to 5 Vdc 0-10 vdc	250 ohms 10 K ohms	NA
Feedback	0 to 20 mA, 4 to 20 mA 0 to 5 Vdc & 1 to 5 Vdc with 250 ohm resistor, (0 to 16 Vdc with 800 ohm resistor)		Dual output 1000 ohms over 90 degrees (135 ohms with 158 resistor) Dual output 1000 ohms over 150 degrees (135 ohms with 158 resistor)
	Slidewire emulation - Provides output voltage ratiometric to shaft position and potentiometric to supply voltage (1 Vdc to 18 Vdc) without a slidewire. Emulates a 100 ohm to 1000 ohm slidewire. 10 mA output maximum.		
Communications	Modbus RTU		NA

	HercuLine 2002	HercuLine 2001	HercuLine 2000
Operating Temperature	-40°C to +75 °C (-40°F to +170 °F)		-40°C to +85 °C (-40°F to +185 °F)
Position sensing	Non-contact position sensor	1000 ohm film potentiometer	Dual 1000 ohm film potentiometers
Sensitivity	0.2 % to 5 % of span, proportional to deadband		NA
Hysteresis	Less than 0.4 % of full scale		NA
Deadband	0.2 % to 5 % of span, programmable. Shipped at 0.5 %		NA
Repeatability	0.2 % of span		NA
Repositions	500 per 90° at 6 sec	400 per 90° at 6 sec	500 per 90° at 6 sec
Voltage/ Supply Stability	0.25 % of span with +10/-15 % voltage change		NA
Temperature Coefficient	Less than ± 0.030 % of span per degree C for 0 °C to 50 °C Less than ± 0.05 % of span per degree C for -40 °C to 75 °C		NA
Zero Suppression	90 % of span.		NA
Input Filters	Selectable spike and low pass filters.		NA
Solid State Motor Control	Two triac switches for clockwise or anti-clockwise motor operation. Transient voltage protection provided.		NA
Failsafe operation	If input signal exceeds configured input range. Selectable and adjustable.		NA
Direction of Rotation	Field programmable		Wire swap
Duty Cycle	Continuous		
Programmable Functions	Selectable and configurable operating parameters: <ul style="list-style-type: none"> • Input range • Input filtering • Input characterization • Security • Digital Input action • Deadband • Failsafe on loss of input signal • Failsafe on loss of position sensor • Direction of rotation • Relay closure action • Communication parameters • Split range operation • Output range • Alarms 		NA

Linkage Kits (Accessory Table of MSG 62-86-16-21)

These kits are to be used to connect the actuator crank arm to a damper or valve. These lengths range from 12 inches to 48 inches (304.8 to 1219.2 mm). Linkage kits are for rod end and push rod separate. The damper end of the connection is supplied by the Customer.

Kit Number	Kit contents
51452354-504	Ball joint for 5/16" (7.93 mm) dia Pushrod
51452354-505	Pushrod 12 in (304.8 mm) long, 5/16 " (7.93mm) dia
51452354-506	Pushrod 18 in (457.2 mm) long, 5/16 "(7.93mm) dia
51452354-507	Pushrod 24 in (609.6 mm) long, 5/16 " (7.93mm) dia
51452354-508	Pushrod 48 in (1219.2 mm) long, 5/16 " (7.93mm) dia

Actuator Crank Arm

The HercuLine 2000 Series Actuators come standard with a 2.8 inch (71.12mm) crank arm (Figure 4). The crank arm uses linkage kits (above). Adjustable radius (1.0 in (25.4mm) to 2.80 in (71.12mm)). Position adjustable through 360° rotation.

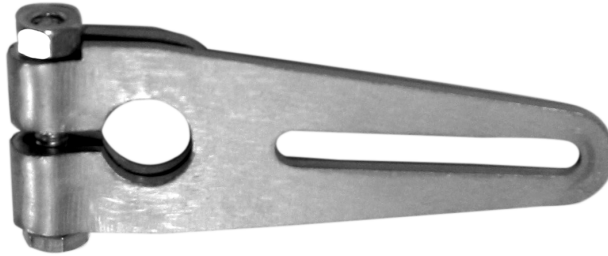


Figure 4 Standard 2.8" (71.12mm) Crank Arm

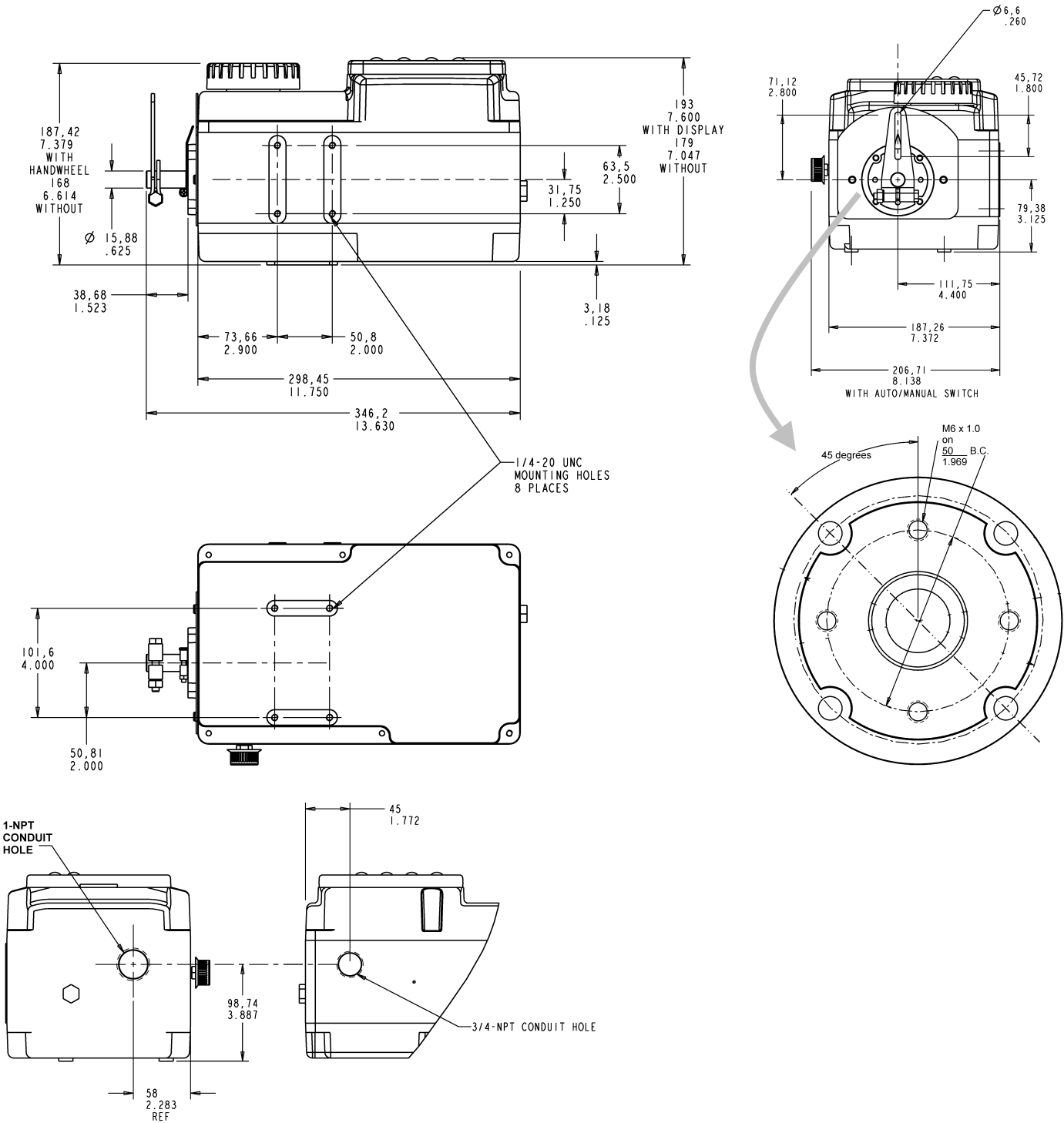


Figure 5 Crank Arm with optional ball joint and push rod

Model Selection Guide

Reference MSG – 62-86-16-21 for the latest options

Outline Dimension Drawings



mm
inches

Actionator M640A, M740A, and M940A replacement

See Honeywell SalesNet at http://il50hpr1.micro.honeywell.com/salesnet/supporting_docs/sales_tools/actionator_to_hl_xover.xls

Warranty/Remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose**. Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

For more information, contact Honeywell sales at (800) 343-0228.

Distributor :

Honeywell

Industrial Measurement and Control

Honeywell
1100 Virginia Drive
Fort Washington, PA