

Submittal

Summer Reach Pump Station – Submersible Pumps & Controls Plymouth, MA



Engineer: Highpoint Engineering – Canton, MA
Contractor: Pumping Systems, Inc. – Whitman, MA

Xylem Water Solutions, Inc.

Flygt Products

78K Olympia Ave

Woburn, MA 01801

Phone: 781-935-6515

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Xylem Water Solutions USA, Inc.**

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Xylem Water Solutions USA, Inc.
Flygt Products

May 16th, 2017

Pumping Systems, Inc.

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Woburn, MA 01801
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Attention: Mr. Don Deems

Quote # 2017-BOS-0140

RE: Flygt Submittal Package

Plymouth, MA – Summer Reach Pump Station

Xylem Water Solutions USA, Inc. is pleased to provide a Submittal Package for the following Flygt equipment, for the above project, as referenced in Sheet C801 by Highpoint Engineering

Pumps & Accessories

- (2) Flygt submersible pump, Model NP-3127, equipped with a 230 Volt / 3-phase / 60 Hz, 10 HP 1745 RPM motor, 50 Ft. length of submersible cable, FLS leakage detector
- (2) 4" Cast Iron Discharge Connection
- (2) 2" Stainless Steel Upper Guide Rail Brackets (guide rails to be provided by others)

Pump Control Panel

(1) 1. Duplex Pump Control Panel

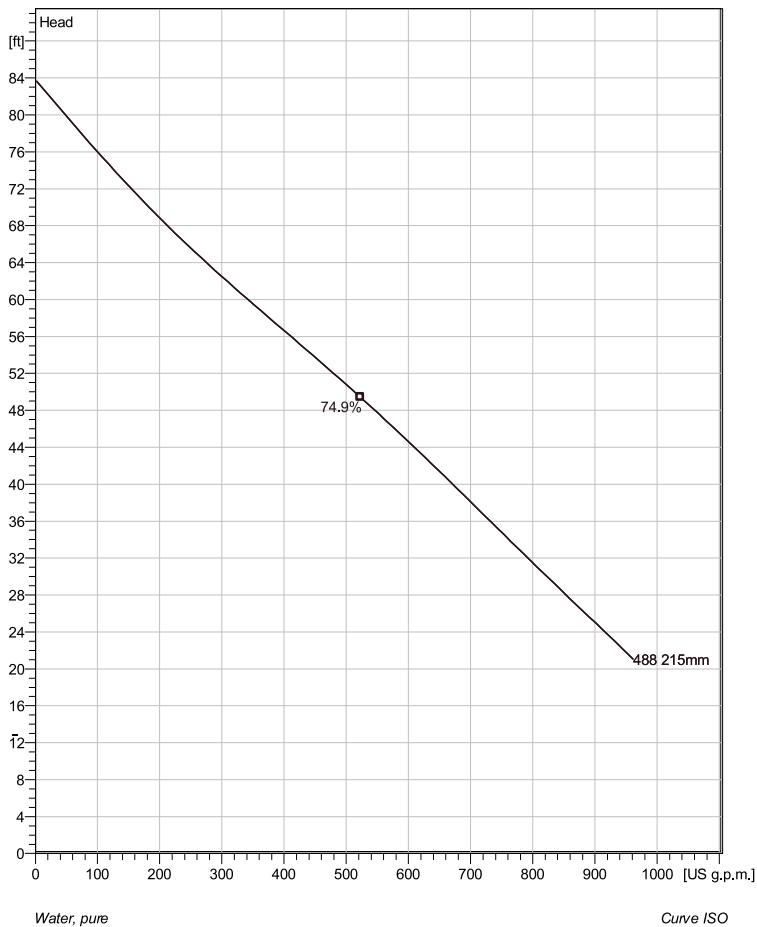
- NEMA 3R – 304 SS Enclosure – 60" x 36" x 16"
- Main & Pump Circuit Breakers
- VFD's for phase conversion
- Pump Controller – Model Dwyer MCP JR
- Submersible Transducer, Model Birdcage, 10 PSI, 40 Ft cord – Shipped loose
- Two (2) Back-up, ENM-10 Level floats, 60 ft cord
- Alarm Horn & Light
- HOA Switches
- Pilot Lights
- Run Meter
- Fuses
- Dry Contacts are as follows
 - Low Level Alarm (Float)
 - Low Level Alarm (Transducer)
 - High Level Alarm (Float)
 - High Level Alarm (Transducer)
 - Pump Fail Alarm

Thank you for the opportunity to provide this quotation.
Please contact me if you need additional information or have any questions; call any time.
Sincerely,

Brendan Kennedy
Flygt Products – A Xylem Brand

NP 3127 HT 3~ 488

Technical specification



Note: Picture might not correspond to the current configuration.

General

Impeller

Impeller material	Grey cast iron
Discharge Flange Diameter	3 15/16 inch
Suction Flange Diameter	3 15/16 inch
Impeller diameter	215 mm
Number of blades	2

Motor

Motor #	N3127.181 21-12-4AL-W 10hp Standard
Stator variant	29
Frequency	60 Hz
Rated voltage	230 V
Number of poles	4
Phases	3~
Rated power	10 hp
Rated current	25 A
Starting current	143 A
Rated speed	1740 rpm
Power factor	
1/1 Load	0.87
3/4 Load	0.84
1/2 Load	0.77
Motor efficiency	
1/1 Load	84.5 %
3/4 Load	85.5 %
1/2 Load	84.0 %

Configuration

Installation: P - Semi permanent, Wet

Project	Project ID	Created by	Created on	Last update
			5/16/2017	

NP 3127 HT 3~ 488

Performance curve



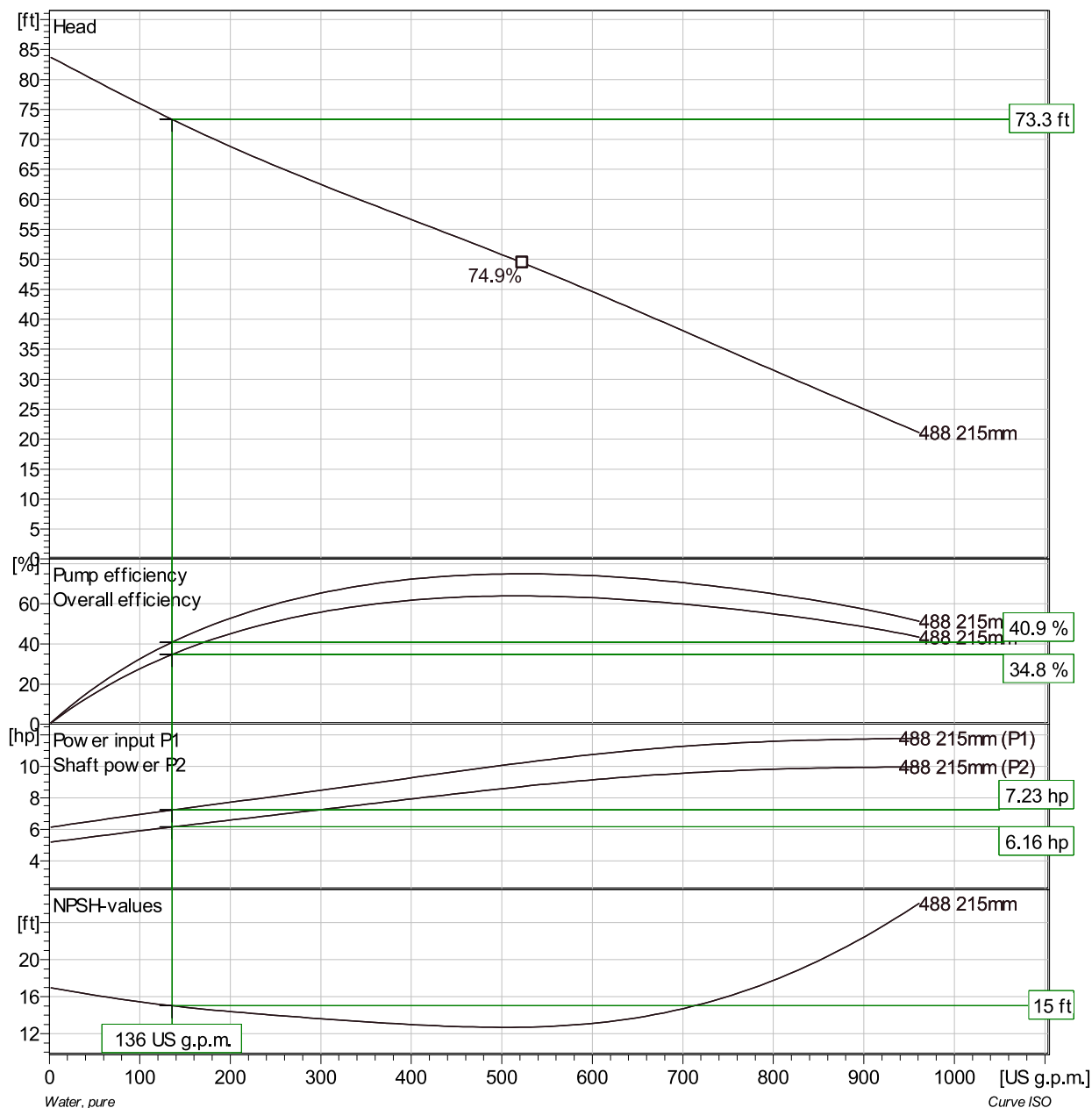
Pump

Discharge Flange Diameter 3 15/16 inch
Suction Flange Diameter 100 mm
Impeller diameter 8 7/16"
Number of blades 2

Motor

Motor # N3127.181 21-12-4AL-W 10hp
Stator variant 29
Frequency 60 Hz
Rated voltage 230 V
Number of poles 4
Phases 3~
Rated power 10 hp
Rated current 25 A
Starting current 143 A
Rated speed 1740 rpm

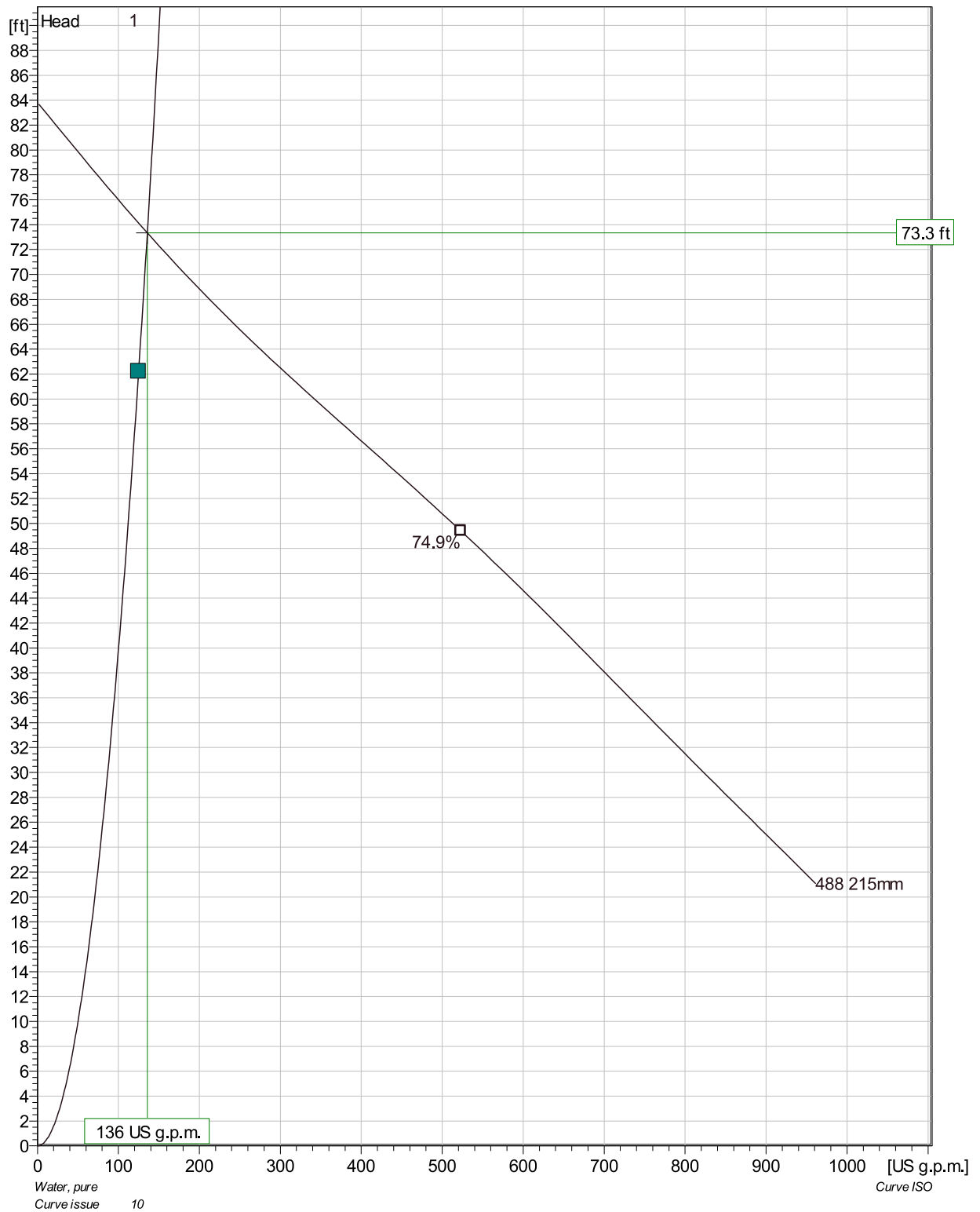
Power factor
1/1 Load 0.87
3/4 Load 0.84
1/2 Load 0.77
Motor efficiency
1/1 Load 84.5 %
3/4 Load 85.5 %
1/2 Load 84.0 %



Duty point		Guarantee	
Flow	Head	ISO:1999	Grade
125 US g.p.m.	62.2 ft	No	

Project	Project ID	Created by	Created on	Last update
			5/16/2017	

NP 3127 HT 3~ 488 Duty Analysis



Pumps running /System	Individual pump			Total					NPSHre
	Flow	Head	Shaft power	Flow	Head	Shaft power	Pump eff.	Specific energy	
1	136 US g.p.m.	73.3 ft	6.16 hp	136 US g.p.m.	73.3 ft	6.16 hp	40.9 %	662 kWh/US MG	15 ft

Project	Project ID	Created by	Created on 5/16/2017	Last update
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Plymouth, MA – Summer Reach Pump Station Flygt Model NP3127.095 HT-488 SPECIFICATION

REQUIREMENTS

Furnish two (2) submersible non-clog wastewater pump(s). Each pump shall be equipped with an 10HP submersible electric motor connected for operation on 230 volts, 3 phase, 60 hertz, wire service, with 50 feet of submersible cable (SUBCAB) suitable for submersible pump applications. The power cable shall be sized according to NEC and ICEA standards and have P-MSHA Approval.

PUMP DESIGN CONFIGURATION (Wet pit installation)

The pump shall be supplied with a mating cast iron 4 inch discharge connection and be capable of delivering 125 GPM at 60.2FT. TDH. Shut off head shall be 84 feet (minimum). The pump(s) shall be automatically and firmly connected to the discharge connection, guided by no less than two guide bars extending from the top of the station to the discharge connection. There shall be no need for personnel to enter the wet-well. Sealing of the pumping unit to the discharge connection shall be accomplished by a machined metal to metal watertight contact. Sealing of the discharge interface with a diaphragm, O-ring or profile gasket will not be acceptable. No portion of the pump shall bear directly on the sump floor.

PUMP CONSTRUCTION

Major pump components shall be of grey cast iron, ASTM A-48, Class 35B, with smooth surfaces devoid of blow holes or other irregularities. The lifting handle shall be of stainless steel. All exposed nuts or bolts shall be AISI type 316 stainless steel construction. All metal surfaces coming into contact with the pumpage, other than stainless steel or brass, shall be protected by a factory applied spray coating of acrylic dispersion zinc phosphate primer with a polyester resin paint finish on the exterior of the pump.

Sealing design shall incorporate **metal-to-metal contact** between machined surfaces. Critical mating surfaces where watertight sealing is required shall be machined and fitted with Nitrile or optional Viton rubber O-rings. Fittings will be the result of controlled compression of rubber O-rings in two planes and O-ring contact of four sides without the requirement of a specific torque limit.

Rectangular cross sectioned gaskets requiring specific torque limits to achieve compression shall not be considered as adequate or equal. No secondary sealing compounds, elliptical O-rings, grease or other devices shall be used.

COOLING SYSTEM

Motors are sufficiently cooled by the surrounding environment or pumped media. A water jacket is not required.

CABLE ENTRY SEAL

The cable entry seal design shall preclude specific torque requirements to insure a watertight and submersible seal. The cable entry shall consist of a single cylindrical elastomer grommet, flanked by washers, all having a close tolerance fit against the cable outside diameter and the entry inside diameter and compressed by the body containing a strain relief function, separate from the function of sealing the cable. The assembly shall provide ease of changing the cable when necessary using the same entry seal. The cable entry junction chamber and motor shall be separated by a stator lead sealing gland or terminal board, which shall isolate the interior from foreign material gaining access through the pump top.

MOTOR

The pump motor shall be a NEMA B design, induction type with a squirrel cage rotor, shell type design, housed in an air filled, watertight chamber, and suitable for Class 1, Division 1, Groups C & D hazardous locations. The stator windings shall be insulated with moisture resistant Class H insulation rated for 180°C (356°F). The stator shall be insulated by the trickle impregnation method using Class H monomer-free polyester resin resulting in a winding fill factor of at least 95%. The motor shall be inverter duty rated in accordance with NEMA MG1, Part 31. The stator shall be heat-shrink fitted into the cast iron stator housing. The use of multiple step dip and bake-type stator insulation process is not acceptable. The use of bolts, pins or other fastening devices requiring penetration of the stator housing is not acceptable. The motor shall be designed for continuous duty handling pumped media of 40°C (104°F) and capable of no less than 30 evenly spaced starts per hour. The rotor bars and short circuit rings shall be made of cast aluminum. Thermal switches set to open at 125°C (260°F) shall be embedded in the stator end coils to monitor the temperature of each phase winding. These thermal switches shall be used in conjunction with and supplemental to external motor overload protection and shall be connected to the control panel. The junction chamber containing the terminal board, shall be hermetically sealed from the motor by an elastomer compression seal. Connection between the cable conductors and stator leads shall be made with threaded compression type binding posts permanently affixed to a terminal board. The motor and the pump shall be produced by the same manufacturer.

The combined service factor (combined effect of voltage, frequency and specific gravity) shall be a minimum of 1.15. The motor shall have a voltage tolerance of plus or minus 10%. The motor shall be designed for operation up to 40°C (104°F) ambient and with a temperature rise not to exceed 80°C. The motor shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet or greater.

The power cable shall be sized according to the NEC and ICEA standards and shall be of sufficient length to reach the junction box without the need of any splices. The outer jacket of the cable shall be oil resistant chlorinated polyethylene rubber. The cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet or greater.

BEARINGS

The pump shaft shall rotate on two bearings. Motor bearings shall be permanently grease lubricated. The upper bearing shall be a single deep groove ball bearing. The lower bearing shall be a two row angular contact bearing to compensate for axial thrust and radial forces. Single row lower bearings are not acceptable. The minimum L_{10} bearing life shall be 50,000 hours at any usable portion of the pump curve.

MECHANICAL SEAL

Each pump shall be provided with a tandem mechanical shaft seal system consisting of two totally independent seal assemblies. The seals shall operate in a lubricant reservoir that hydro-dynamically lubricates the lapped seal faces at a constant rate. The lower, primary seal unit, located between the pump and the lubricant chamber, shall contain one stationary and one positively driven rotating, corrosion and abrasion resistant tungsten-carbide ring. The upper, secondary seal unit, located between the lubricant chamber and the motor housing, shall contain one stationary and one positively driven rotating, corrosion and abrasion resistant tungsten-carbide seal ring.

Each seal interface shall be held in contact by its own spring system. The seals shall require neither maintenance nor adjustment nor depend on direction of rotation for sealing. The position of both mechanical seals shall depend on the shaft. Mounting of the lower mechanical seal on the impeller hub will not be acceptable. For special applications, other seal face materials shall be available.

Each pump shall be provided with a lubricant chamber for the shaft sealing system. The lubricant chamber shall be designed to prevent overfilling and to provide lubricant expansion capacity. The drain and inspection plug, with positive anti-leak seal shall be easily accessible from the outside. The seal system shall not rely upon the pumped media for lubrication. **The motor shall be able to operate dry without damage while pumping under load.**

Where a seal cavity is present in the seal chamber, the area about the exterior of the lower mechanical seal in the cast iron housing shall have cast in an integral concentric spiral groove. This groove shall protect the seals by causing abrasive particulate entering the seal cavity to be forced out away from the seal due to centrifugal action.

Seal lubricant shall be FDA Approved, nontoxic.

PUMP SHAFT

Pump and motor shaft shall be the same unit. The pump shaft is an extension of the motor shaft. Couplings shall not be acceptable. The shaft shall be stainless steel – ASTM A479 S43100-T. If a shaft material of lower quality than stainless steel – ASTM A479 S43100-T is used, a shaft sleeve of stainless steel – ASTM A479 S43100-T is used to protect the shaft material. However, shaft sleeves only protect the shaft around the lower mechanical seal. No protection is provided in the oil housing and above. Therefore, the use of stainless steel sleeves will not be considered equal to stainless steel shafts.

IMPELLER

The impeller shall be of Hard-Iron™ (ASTM A-532 (Alloy III A) 25% chrome cast iron), dynamically balanced, semi-open, multi-vane, back swept, screw-shaped, non-clog design. The impeller leading edges shall be mechanically self-cleaned automatically upon each rotation as they pass across a spiral groove located on the volute suction. The leading edges of the impeller shall be hardened to Rc 60 and shall be capable of handling solids, fibrous materials, heavy sludge and other matter normally found in wastewater. The screw shape of the impeller inlet shall provide an inducing effect for the handling of up to 5% sludge and rag-laden wastewater. The impeller to volute clearance shall be readily adjustable by the means of a single trim screw. The impeller shall be locked to the shaft, held by an impeller bolt and shall be coated with alkyd resin primer.

VOLUTE / SUCTION COVER

The pump volute shall be a single piece grey cast iron, ASTM A-48, Class 35B, non-concentric design with smooth passages of sufficient size to pass any solids that may enter the impeller. Minimum inlet and discharge size shall be as specified. The volute shall have a replaceable suction cover insert ring in which are cast spiral-shaped, sharp-edged groove(s). The spiral groove(s) shall provide trash release pathways and sharp edge(s) across which each impeller vane leading edge shall cross during rotation so to remain unobstructed. The insert ring shall be cast of Hard-Iron™ (ASTM A-532 (Alloy III A) 25% chrome cast iron) and provide effective sealing between the multi-vane semi-open impeller and the volute housing.

PROTECTION

All stators shall incorporate thermal switches in series to monitor the temperature of each phase winding. The thermal switches shall open at 125°C (260°F), stop the motor and activate an alarm.

A leakage sensor shall be available as an option to detect water in the stator chamber. The Float Leakage Sensor (FLS) is a small float switch used to detect the presence of water in the stator chamber. When activated, the FLS will stop the motor and send an alarm both local and/or remote. **USE OF VOLTAGE SENSITIVE SOLID STATE SENSORS AND TRIP TEMPERATURE ABOVE 125°C (260°F) SHALL NOT BE ALLOWED.**

The thermal switches and FLS shall be connected to a Mini CAS (Control and Status) monitoring unit. The Mini CAS shall be designed to be mounted in any control panel.

Installation Procedures

The faultless functioning of a Flygt Pumping Station will depend upon the correct selection of the pump to suit system requirements and proper installation. A great majority of Flygt Electric Submersible Wastewater Pumps are installed in underground wet pits with Automatic Discharge Connections, Guide Bars and Access Covers as shown in the station drawings.

Wet Pits constructed of precast concrete rings offer significant savings in labor costs over poured-in-place concrete, masonry or brick and are universally accepted for use in sanitary or storm sewer systems. Precast concrete sections are available up to 120 inch inside diameter (sometimes up to 144 inch inside diameter) throughout the U.S. and are generally manufactured in accordance with the provisions of ASTM Specification C478.

Because of this, Flygt official engineering documentation is based on stations designed in precast concrete circular man-holes. Each individual station drawing shows a suggested Simplex and a suggested Duplex Pumping Station built of precast concrete sections installed between a Bottom Slab and a Top Slab (the Top Slab, usually at ground level, contains the cast-in Access Cover).

The configurations and dimensions shown on these Proposed Layouts are suggested minimum requirements only, all details, including sizing of pit, type, size, location and arrangement of valves and piping, etc. are to be specified by the Consulting Engineer and are subject to his approval.

The following is a partial list of useful suggestions for construction and installation. ***Please always observe local regulations applicable.***

A. Excavation:

Excavate a large enough hole to provide sufficient working room around the station. The outside diameter of the Bottom Slab should be at least one foot larger than that of the concrete sections used.

B. Connecting Pipes:

Provide connecting holes for the Influent Pipe, Effluent Pipe(s) and Cable Thrulets in accordance with the Engineer's specification. Flexible joints outside of concrete wall will reduce the danger of dislocation due to settlement.

C. Backfill:

Backfill gradually and evenly around station after concrete and joints have hardened. Compact backfill to minimize post-installation settlement.

D. Top Slab with Access Cover:

Diameter of Top Slab shall be at least two feet larger than O.D. of ring sections. The Access Cover must be installed and properly oriented in the Top Slab.

1. See Station Drawings for Pump Model and Access Cover location in relation to the centerline of the station.
2. Positioning of the Hinge Side of the Cover (See Accessories Section).
3. The Top Slab and Access Cover must be level.

E. Automatic Discharge Connection:

The Automatic Discharge Connection must be attached to the Bottom Slab at the exact location required relative to the Access Cover.

SUGGESTED PROCEDURES:

1. Attach the Upper Guide Bar Bracket(s) to the Access Frame (See Accessories Section). Also, the centerline of the Bracket(s) will determine the centerline of the installed pump(s).
2. Place the pump Discharge Connection(s) on the Bottom Slab and line up as shown in the Accessories Section.
3. Cut to length and install the Guide Bars between the Upper Guide Bar Bracket(s) and Discharge Connection(s).
4. Before securing anchor bolt nuts, check across the Discharge Connection(s) Outlet Flange(s) face with level and shim if necessary. Guide Bars should be Parallel and Vertical.

F. Internal Piping and Manifold:

Use proper gaskets, tighten bolts gradually and evenly. In deep stations, install Discharge pipe Brackets to relieve Discharge Connections from overload and intermediate Guide Bar Brackets to prevent Guide Bars from bending.

G. Installation of Pump Units:

Lower Pump Units into place along guide bars. Check visually metal-to-metal contact between Volute Flange and Discharge Connection. If necessary, re-check and re-align Discharge Connection(s) and Guide Bars with pumps in place.

Installation Procedures

H. Grouting:

After proper alignment of all components, including metal-to-metal connection of pump flange is established, grout Access Cover, Discharge Connection(s) and Pipe Thrulets. Build up and shape slopes at bottom of the station as shown in Station Drawings. This will help in preventing build-up of solids at the bottom where side walls meet the floor.

I. Surface Protection:

An epoxy-coal tar system is suggested for all internal surfaces, concrete or metallic, if possible, follow the recommendations in WPCF Manual of Practice No. 17 "Paints and Protective Coatings for Wastewater Treatment Facilities" or the instructions of a reputable manufacturer of protective coating systems, such as Carboline, Koppers, Inertol, Perry-Austen, etc. Proper surface preparation and careful application will pay off in reduced maintenance costs and longer life.

J. Storage of Pump Units Prior to Start-Up:

It is **not** good practice to store the Pump Units in the wet pit, especially when long periods between installation

and start-up are anticipated. If this practice cannot be avoided, rather than leaving them on their Discharge Connections, secure them and their power cable at some point above any anticipated liquid level. Pay special attention to unprotected open cable ends; seal them off and make sure that they are not submerged or exposed to moisture. Penetration of moisture through the cable may cause breakdown of the insulation, arcing at the pump terminal board, destruction of the Junction Chamber and serious damage to the pump. If in doubt, before start-up, re-check the cable, Cable Entry and Junction Chamber following instructions in the Maintenance Manual under "Electrical Checks". If possible, connect Pumps power cables to Control Panel and during longer periods until the official start-up, start and run the units manually for 30 seconds at least once every two weeks. (see "Storage" in this section.)

Storage

Each Flygt pump leaves the factory properly assembled and prepared to perform even after a reasonable idle time in storage. However, as prolonged idle time can be detrimental to any rotating machinery, the procedures outlined below should be followed in order to insure that the equipment is in top condition to operate when finally installed. Whenever possible, store pumping units in a dry environment free of extreme temperatures and strong direct sunlight.

NEW pumps:

Storage 6 to 12 months:

In general, rotating machinery left idle for extended periods of time, tends to establish a “set” position due to inaction of the moving parts. Some of these areas may be damaged (especially seals) from the sudden fast breakaway of start-up after a prolonged idle time. To insure that all rotating parts are free for final installation and start-up, it is good practice to rotate the impeller by hand once a month. It is also good practice to relieve the tension on the cable entry sealing grommet by backing off the cable entry compression screws slightly. If this is done, it is most important that a clear note be attached as a reminder to:

Re-Tighten Cable Entry Compression Screws Before Installation.

Storage 12 to 24 months:

In addition to the above, apply a protective spray coating of silicone or rust inhibiting oil to the impeller and inside of the volute by spraying in through the volute outlet and up through the volute inlet. Also coat the volute outlet flange face.

USED pumps:

Before storing a used pump for an extended period of time, the unit should be dismantled, checked for any defects, repaired where necessary and reassembled. At reassembly, follow instructions in the **Service Manual**, especially regarding seal assemblies. Protect the impeller and volute as mentioned in the paragraph above.

In all cases, it is good practice to check all external bolts, nuts and screws for tightness before final installation after extended storage.

CONTROLS:

It is most important to make sure that Electrical Controls, when subjected to extended storage, be stored in a protected dry environment free from any corrosive atmosphere. Moisture in any form, including condensation, can cause serious corrosion problems to the contact point surfaces as well as terminal connections.

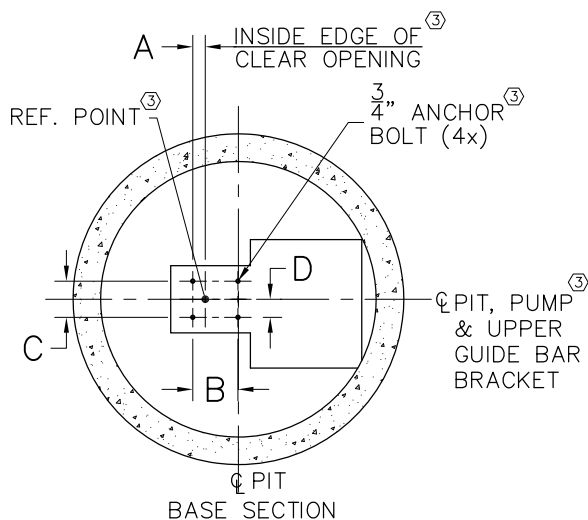
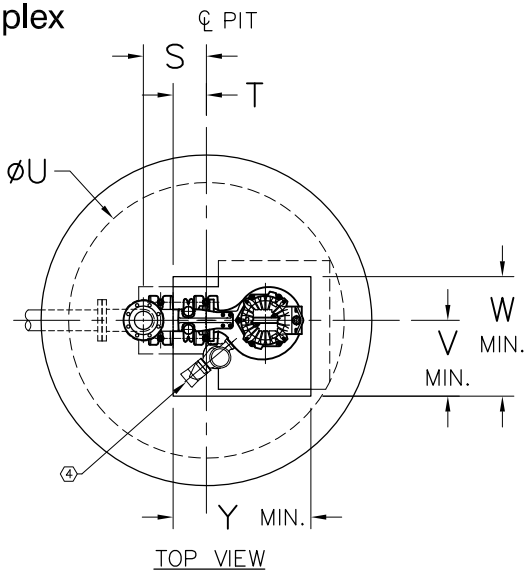
Even though all terminal connections have been made tight on initial assembly at the factory, they may not remain 100% tight over an extended storage period due to the compressibility of the copper wire and possible movement due to variations in ambient temperature. The problem will vary in degree depending on wire size and whether the terminal connection is of solid or stranded wire. To insure proper operation, recheck all terminal connection screws for tightness prior to placing the control on line.

CP/DP/FP/NP-3127

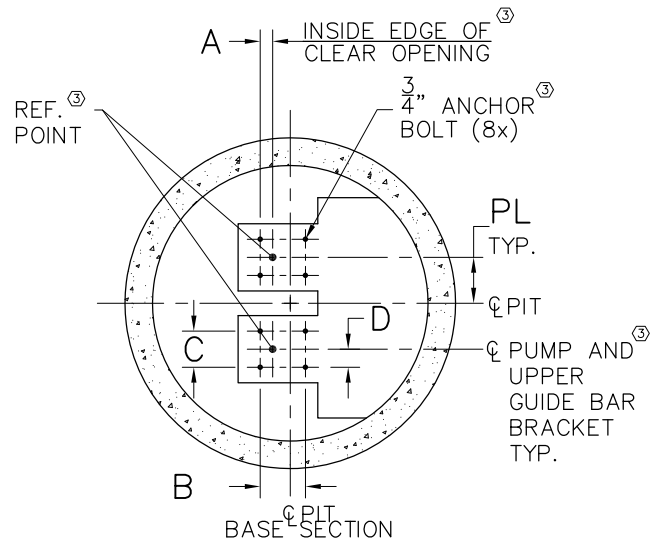
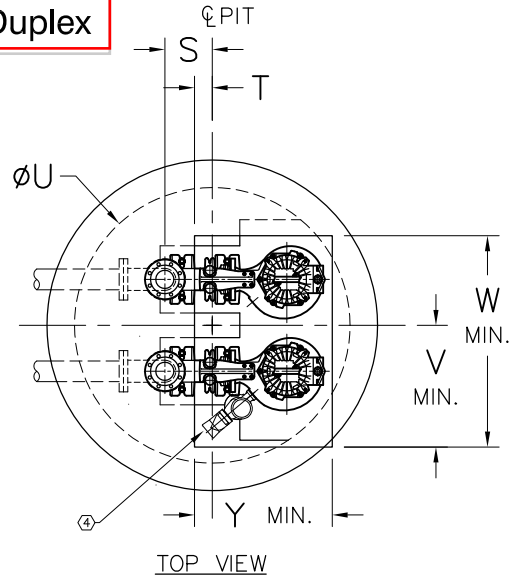
NOTES:

1. CONFIGURATION AND DIMS. SHOWN ARE SUGGESTED REQUIREMENTS ONLY. ALL DETAILS, INCLUDING SIZING OF PIT, TYPE, LOCATION AND ARRANGEMENT OF VALVES AND PIPING, ETC. ARE TO BE SPECIFIED BY THE CONSULTING ENGINEER AND ARE SUBJECT TO THEIR APPROVAL.
2. REFERENCE GENERIC DUPLEX LIFT STATION LAYOUT FOR ELEVATION VIEW.
3. LOCATE ANCHOR BOLTS USING INSIDE EDGE OF CLEAR OPENING AND PUMP CENTERLINE AS REFERENCE POINT. BOLT LOCATIONS MUST BE HELD TO MAINTAIN EXACT POSITION OF PUMP TO CLEAR OPENING.
4. FLYGT MIX-FLUSH VALVE.

Simplex



Duplex



ALL DIMENSIONS ARE IN INCHES

ALL DIMENSIONS ARE IN INCHES																				
	MODEL	NOM. SIZE	VERSION	SIMPLEX										DUPLEX						
				A	B	C	D	S	T	U	V	W	Y	S	T	U	PL	V	W	Y
	FP/NP	3"	SH	2 $\frac{3}{8}$	9 $\frac{1}{2}$	8	4	15 $\frac{1}{4}$	9 $\frac{1}{4}$	60	17 $\frac{1}{2}$	26	30	19 $\frac{3}{8}$	13 $\frac{3}{8}$	72	8 $\frac{1}{2}$	26	43	30
***	CP	4"	HT	2 $\frac{3}{4}$	9 $\frac{1}{8}$	8	4	13 $\frac{3}{4}$	7 $\frac{1}{4}$	60	18 $\frac{1}{2}$	28	30	17	10 $\frac{1}{2}$	72	10	28 $\frac{1}{2}$	48	30
****	CP/NP	4"	HT	2 $\frac{3}{4}$	9 $\frac{1}{8}$	8	4	13 $\frac{3}{4}$	7 $\frac{1}{4}$	60	18 $\frac{1}{2}$	28	30	17	10 $\frac{1}{2}$	72	10	28 $\frac{1}{2}$	48	30
	DP	4"	MT	2 $\frac{3}{4}$	9 $\frac{1}{8}$	8	4	13 $\frac{3}{4}$	7 $\frac{1}{4}$	60	10 $\frac{1}{4}$	29	29	17	10 $\frac{1}{2}$	72	10	20 $\frac{1}{2}$	49	29
	CP/NP	4"	MT	2 $\frac{3}{4}$	9 $\frac{1}{8}$	8	4	13 $\frac{3}{4}$	7 $\frac{1}{4}$	60	16 $\frac{1}{2}$	26	30	17	10 $\frac{1}{2}$	72	10	28 $\frac{1}{2}$	46	30
*	CP/NP	6"	MT	4 $\frac{3}{8}$	11	10	5	11	3 $\frac{3}{8}$	60	16 $\frac{1}{2}$	26	30	13 $\frac{1}{2}$	5 $\frac{1}{8}$	72	11	28 $\frac{1}{2}$	48	30
**	CP/NP	6"	MT	4 $\frac{3}{8}$	11	10	5	11	3 $\frac{3}{8}$	60	17 $\frac{1}{2}$	26 $\frac{1}{2}$	30	13 $\frac{1}{2}$	5 $\frac{1}{8}$	72	11	28 $\frac{1}{2}$	48 $\frac{1}{2}$	30
	CP/NP	6"	LT	5 $\frac{1}{2}$	11	10	5	16	3 $\frac{3}{8}$	72	11 $\frac{1}{2}$	26 $\frac{1}{2}$	32	15 $\frac{1}{2}$	8 $\frac{1}{4}$	72	11	22 $\frac{1}{2}$	48 $\frac{1}{2}$	32
	CP/NP	8"	MT	5 $\frac{1}{2}$	11	10	5	14 $\frac{3}{8}$	5 $\frac{1}{2}$	72	17 $\frac{1}{2}$	26 $\frac{1}{2}$	30	10 $\frac{1}{4}$	1 $\frac{3}{8}$	72	11	28 $\frac{1}{2}$	48 $\frac{1}{2}$	30
	CP/NP	8"	LT	5 $\frac{1}{2}$	11	10	5	14 $\frac{3}{8}$	5 $\frac{1}{2}$	72	11 $\frac{1}{2}$	27 $\frac{1}{2}$	32	10 $\frac{1}{4}$	1 $\frac{3}{8}$	72	11	22 $\frac{1}{2}$	49 $\frac{1}{2}$	32

* WITH 4" VOLUTE OUTLET

** WITH 6" VOLUTE OUTLET

*** WITH 462 OR 463 IMPELLER

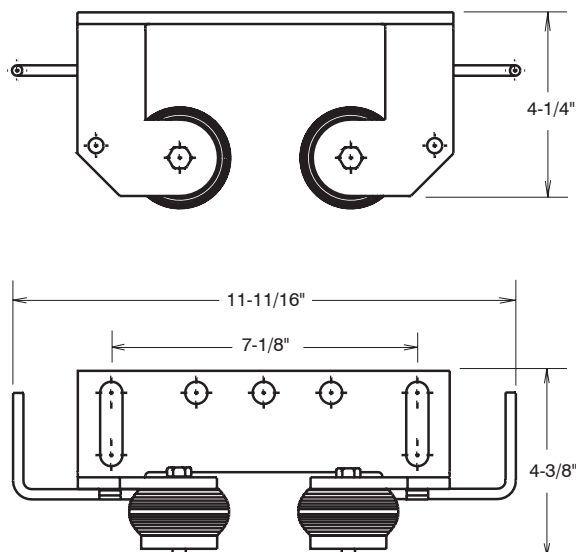
**** WITH 481, 483-485, 487-489 IMPELLER

Upper Guide Bar Bracket (for 3000, 5500 & 8000 Series Pumps)

2" UPPER GUIDE BAR BRACKET

613 68 04

316 Stainless Steel



Note: use with 2" nominal guide bars

Standard for the following pumps:

DP-3068
DP-3080
CP/DP/FP/NP-3085
CP/FP/NP-3102
CP/FP/NP-3127
NP/FP-3153
NP/FP-3171
HP-5520, 5530
DP-8050, 8053, 8056, 8058



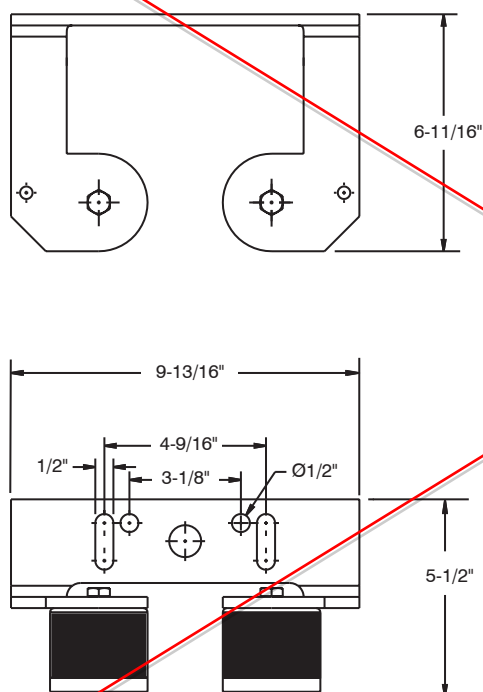
3" UPPER GUIDE BAR BRACKET

661 54 00

Galvanized Steel

661 54 01

316 Stainless Steel



Note: use with 3" nominal guide bars

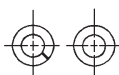
MOUNTING HARDWARE 14-59 00 00 (stainless steel)



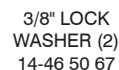
3/8"-16 LATERAL NUT
14-46 57 05



HEX HEAD BOLT (2),
3/8" -16 x 7/8"
14-46 20 25



3/8" PLAIN WASHER (2)
14-46 50 07



3/8" LOCK
WASHER (2)
14-46 50 67

Standard for the following pumps:

NP/FP-3171 CP-3351
NP/FP-3202 CP/NP-3356
CP/NP/RP-3231 CP/NP-3400
CP-3240 CP-3501
NP-3301 CP-3531
CP/NP-3306 CP-3602
CP/NP-3312 CP-3800
NP-3315 HP-5570

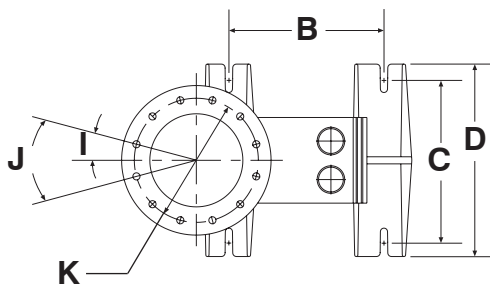


Standard CP/NP Discharge Connections (Cast Iron)

All dimensions (inches)

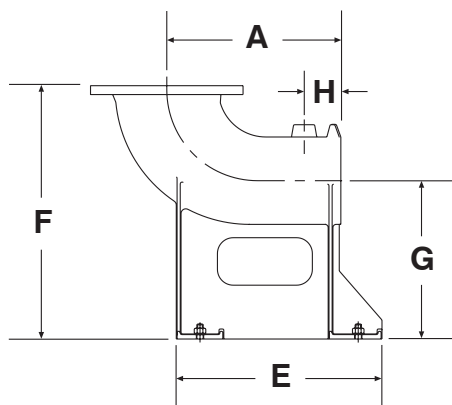
Pump Model	Part Number	Disch. Inlet	Disch. Outlet	A	B	C	D	E	F	G	H	I	J	K
2" - 3045, 3057, CP/DP/FP-3068.	486 55 01	2"	2"-11 1/2 NPT	3 13/16	4	4 1/2	5 1/2	7 1/4	6 3/4	3 15/16	7/8	---	---	---
2 1/2" - DP/FP-3068.	493 17 06	2 1/2"	2 1/2"	11 5/8	7 7/8	4 3/4	7 7/8	11 7/16	9 7/8	6 1/2	4 9/16	45°	90° x 4	5 5/8
3" - 3045, 3057, CP-3068.	555 48 01	2"	3-8 NPT	6 3/4	5 1/2	4 1/8	5 1/2	10 3/4	6 3/4	3 15/16	7/8	---	---	---
3" - DP-3068, 3080, 3085, 3102, 3127, 3153.	444 68 05	3"	3"	14	9 7/8	8	10 5/8	15 3/8	15 3/4	7 7/8	4 9/16	45°	90° x 4	6
4" - 3080, 3085, 3102, 3127, 3153, 3171, 3202.	540 13 05	4"	4"	14 3/8	9 7/8	8	10 5/8	15 3/8	15 3/4	7 7/8	4 9/16	22.5°	45° x 8	7 1/2
6" - 3102, 3127(MT), 3153, 3171.	444 70 06	5 1/2"	6"	15 9/16	11	10	12 3/16	15 3/8	17 3/4	9 7/8	4 9/16	22.5°	45° x 8	9 1/2
6" - 3153, 3171, 3202.	602 33 06	5 1/2"	6"	15 9/16	11	10	12 3/16	15 15/16	17 3/4	9 7/8	4 9/16	22.5°	45° x 8	9 7/16
6" - R3231	388 25 06	6"	6"	20 11/16	19 3/4	15 3/4	19 3/4	23 5/8	15 3/4	7 7/8	6 7/8	22.5°	45° x 8	9 7/16
6" - 3127(LT), 3301, 3315.	604 56 06	6"	6"	15 9/16	11 1/8	10	12 3/16	15 15/16	18	10 1/8	4 9/16	22.5°	45° x 8	9 7/16

Note: Alternative discharge connections may be available, contact Flygt Application Engineering.



Caution:

Contact Flygt applications engineering department when making a pump/discharge connection combination other than those paired in the chart above.

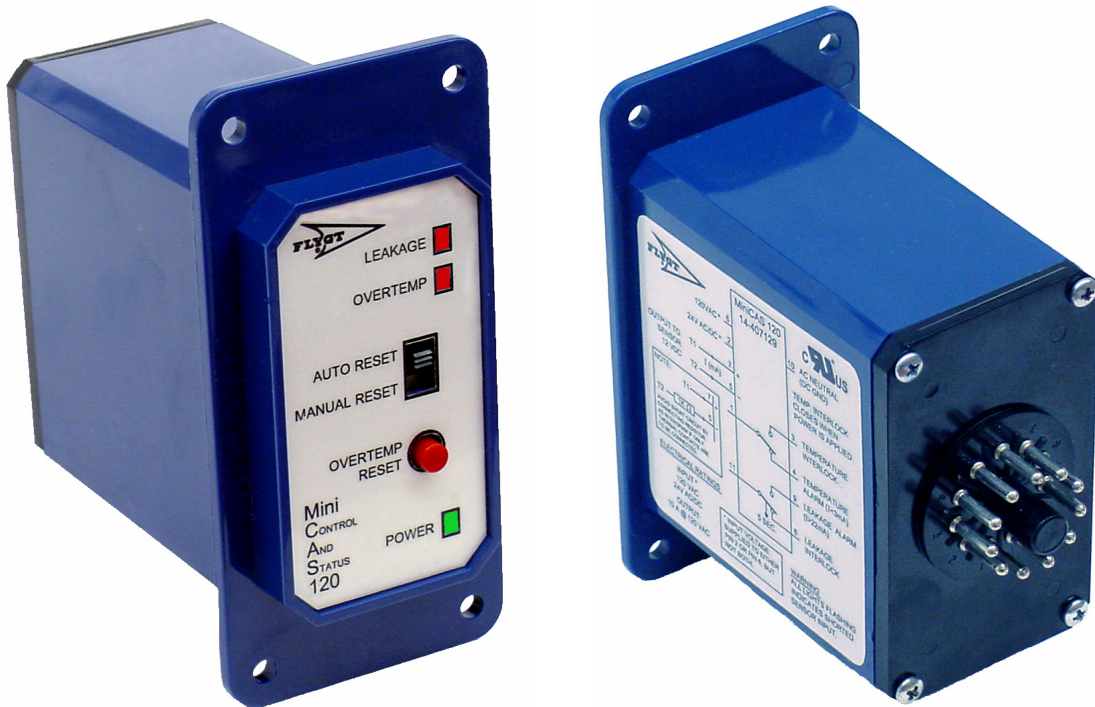


Note:

The discharge connection shown here is typical in appearance for most pumps.

Mini-CAS 120

PART NO. 14-407129



Features:

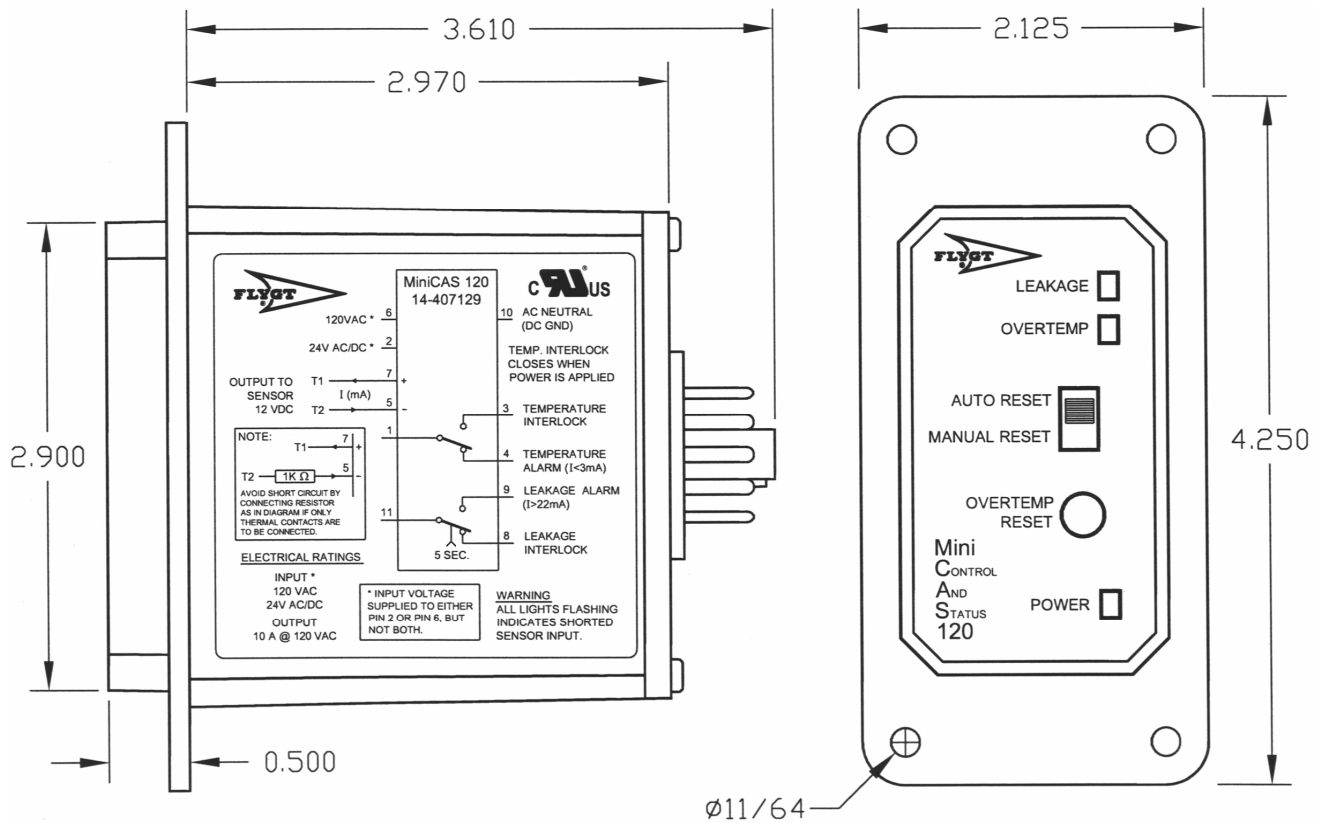
- Plug in replacement for existing MiniCAS / FUS unit
- 120 VAC, 24 VAC, or 24 VDC powered
- Durable plastic enclosure with flange for mounting on door of pump control enclosure
- Highly visible red LEDs for indication of Leakage and Temperature alarms
- Green LED for indication power is applied
- Temperature alarm reset mode select switch, for selection of Manual or Auto reset modes
- Temperature alarm reset push-button on front of unit
- Input power transient protected
- Sensor input circuit transient protected
- Sensor input circuit short circuit protected
- Noise Filter on Sensor Input
- Sensor circuit supply voltage regulated to 12 VDC
- Detailed connection diagram on side of unit



ITT FLYGT CORPORATION
35 Nutmeg Drive
Trumbull, Connecticut 06611
Phone (203) 380-4700
FAX (203) 380-4705

Mini-CAS 120

PART NO. 14-407129

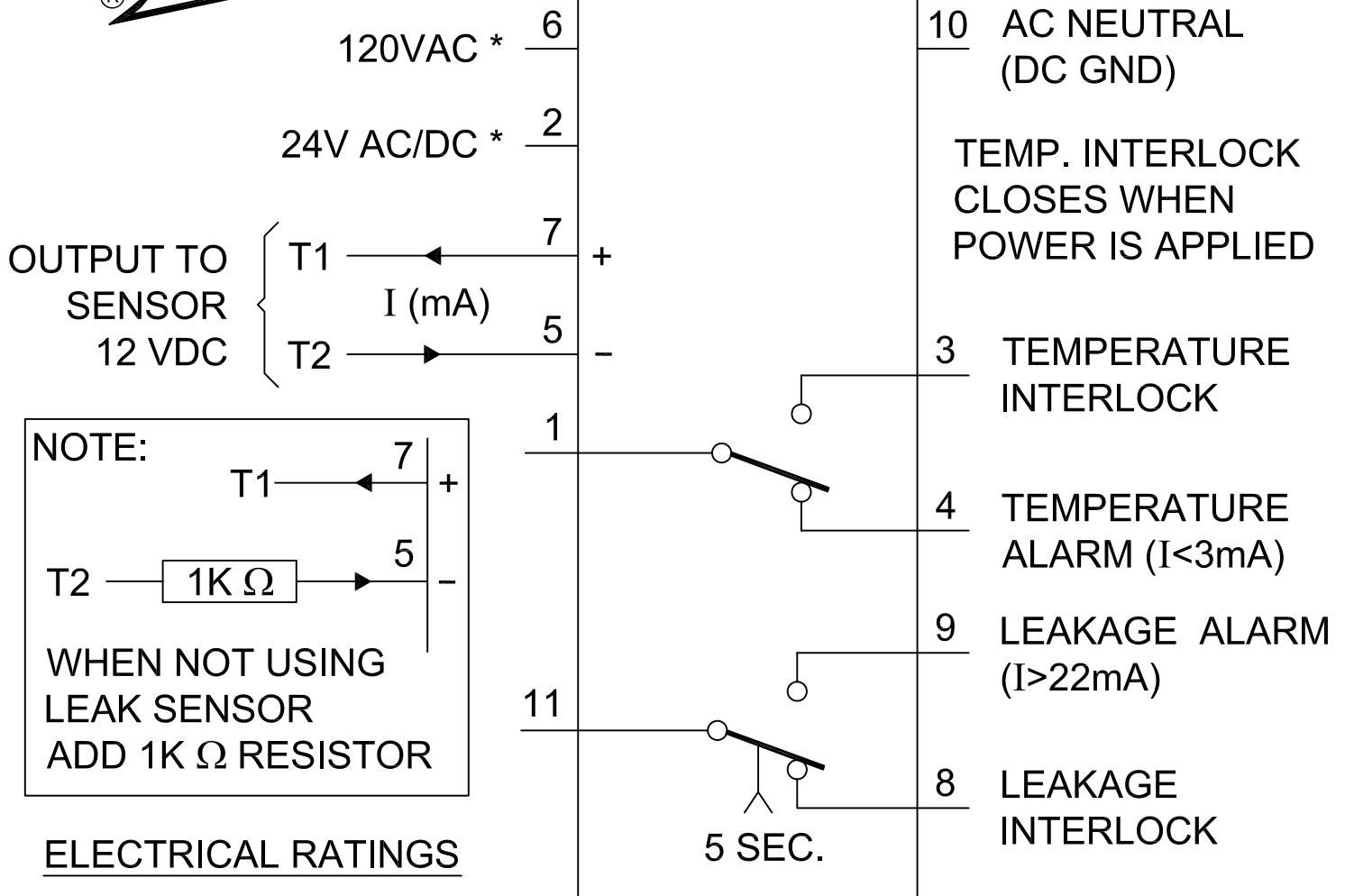


Specifications:

- Input Power: 120 VAC $\pm 10\%$, 7.0 VA max
24 VAC $\pm 10\%$, 3.5 VA max
24 VDC $\pm 10\%$, 125 mA max
- Input Power Transient Protection: Metal Oxide Varistor
- Sensor Input Transient Protection: Metal Oxide Varistor
- Relay Contact Rating: 10A @ 250 VAC
- Relay Contact Material: Silver Cadmium Oxide (AgCdO)
- Ambient Operating Temperature: -20°C to $+65^{\circ}\text{C}$ (-4°F to $+149^{\circ}\text{F}$)
- Agency Approvals: UL 508, CAN/CSA (Pending)
- Alarm Indicators: Super Bright Red LED
- Power On Indicator: Green LED
- Enclosure: Blue Lexan (141R) or Noryl (PX9406)
- Faceplate Overlay: Silver Lexan with Black Text
- Side Label: Silver Lexan with Black Text
- Sensor Circuit Supply Voltage: Regulated 12 VDC $\pm 10\%$,
- Weight 11.75 oz (334 grams)
- Temperature Alarm Trip Point: Sensor Current $\leq 3 \text{ mA} \pm 5\%$
- Leak Alarm Trip Point: Sensor Current $\geq 22 \text{ mA} \pm 5\%$



MiniCAS 120 14-407129



ELECTRICAL RATINGS

INPUT *

120VAC

24V AC/DC

OUTPUT

10 A @ 240 VAC

* INPUT VOLTAGE SUPPLIED TO EITHER PIN 2 OR PIN 6, BUT NOT BOTH.

WARNING

ALL LIGHTS FLASHING INDICATES SHORTED SENSOR INPUT.

Control Submittal

SCHEMATIC & SUBMITTAL DATA

**DUPLEX CONTROL PANEL
230V-1Ø INCOMING POWER
230V-3Ø-10HP
FOR
SUMMER REACH-PLYMOUTH**

XYLEM INC. MA

This submittal is based upon our interpretation of the specifications supplied,
and written and/or signed approval of this submittal will be required before
production can begin.

COMPANY: _____

DATE: _____

SIGNED: _____

SUBMITTED: 5-16-17

One Year “Limited” Warranty

For a twelve (12) month period from date of invoice, subject to the terms and conditions herein after set forth, Ohio Electric Control, Inc. reserves the right and option, in its sole discretion, to repair or replace defective equipment, parts or components. Labor, shipping and expenses are not covered by this Warranty.

This warranty does not apply to the following:

- 1) To defects or malfunctions resulting from failure to properly install, operate or maintain the unit in accordance with good trade practices.
- 2) To defects or malfunctions resulting from abuse, accident or negligence.
- 3) To normal maintenance service and the parts and labor used in connection with same.
- 4) To units which are not installed in accordance with applicable local, state and federal codes or ordinances and good trade practices.
- 5) To units which are moved from their original installation location.
- 6) To units which are used for purposes other than what it was designed and manufactured for.
- 7) To units which are damaged by lightning, conditions beyond the control of Ohio Electric Control, Inc., or other “acts of God”.

Contact your nearest authorized Ohio Electric Control, Inc. dealer for warranty service. Any item to be replaced must be returned to Ohio Electric Control, Inc., 2395 Rock Road., Ashland, Ohio 44805, or such other places as Ohio Electric Control, Inc. may designate, freight prepaid.

AFTER THE EXPIRATION OF THE TIME PERIOD OF THIS WARRANTY, THERE ARE NO WARRANTIES OF ANY KIND, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. (**NOTE!** SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.)

IN NO EVENT SHALL OHIO ELECTRIC CONTROL, INC. BE LIABLE OR RESPONSIBLE FOR ANY CONSEQUENTIAL, INCIDENTAL OR SPECIAL DAMAGES RESULTING FROM OR RELATED IN ANY MANNER TO ANY OHIO ELECTRIC CONTROL, INC. PRODUCT, PARTS OR SERVICE. (**NOTE!** SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU).

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS; YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND WHAT IS STATED ABOVE.

SPECIFICATIONS

ELECTRICAL NOTES:

INCOMING POWER: 230V - 1 ϕ - 3 WIRE SERVICE
CONTROL POWER: 115V - 1 ϕ
MOTOR HORSEPOWER: 10HP.
MOTOR FULL LOAD AMPS: 25F.L.A.

CONTROL PANEL NOTES:

1. The control panel will be provided with aluminum inner-door, to mount circuit breaker operators, key pad (VFD), indicator lights, selector switches, and elapsed time meters.
2. The control panel will be provided with a painted steel back panel to mount circuit breakers, variable frequency drives, fuses, relays, ground lugs and terminal blocks.
3. The alarm light will be mounted to the top of the control panel enclosure.
4. The SONALERT audible alarm will be mounted to the bottom of the control panel enclosure.
5. The control panel will be provided with auxiliary contacts for connection to a remote alarm device.
6. The control panel will be provided with plastic wireway for placing wire in neat bundles.
7. The control panel wire will be provided with numbered labels for easy identification in the field.
8. The control panel components, mounted on the inner door, will be labeled with engraved labels.
9. The control panel components will be labeled.
10. The electrical control panel will be "UL 508A" listed and labeled.

OPERATIONS

SPECIAL NOTES:

- Pump controller will activate pump(s) by monitoring liquid level using a pressure transducer, and will be backed up with floats.
- The lead pump selector switch, located on the alternator, allows personnel to choose which motor is to be used as “lead” and “lag” or to allow the motors to alternate as “lead” and “lag”.
- Elapsed time meters are used to monitor how long the motors have operated.
- A time delay relay is used to prevent both motors from starting simultaneously.
- The alarm test switch, labeled "On-Off-Test", allows personnel to test the audible and visual exterior alarms when the switch is placed in the "test" position.

MOTOR CONTROL:

Manual Mode:

Place the Hand-Off-Auto selector switch in the "Hand" position. The pump motor will run.

Auto Mode:

1. Place the Hand-Off-Auto selector switch in the "Auto" position.
2. When the liquid level in the wet well rises to the "off" and "on" levels, the lead pump will run.
3. The pump will stop when the liquid level drops below the "off" level.
4. The alternating relay will index to choose the next pump as lead on the next cycle.
5. If the lead pump is running and liquid level continues to rise to the "lag on" level, the lag motor will run along with the lead motor until the level drops below the "off" level.

Alarm:

Low Level (transducer): The liquid level drops below the "redundant off" or "low" level.

- The starter circuitry is interrupted and the motor stops.
- An indicator light on the inner-door will illuminate.
- The audible exterior alarm will sound and can be shut off by pressing the silence push button.
- The visual exterior alarm will flash.

- Auxiliary alarm contact will signal a remote alarm device.

Low Level (float): The liquid level drops below the "redundant off" or "low" level.

- The starter circuitry is interrupted and the motor stops.
- An indicator light on the inner-door will illuminate.
- The audible exterior alarm will sound and can be shut off by pressing the silence push button.
- The visual exterior alarm will flash.
- Auxiliary alarm contact will signal a remote alarm device.

High Level (transducer): The liquid level rises above the "high" level.

- An indicator light on the inner-door will illuminate.
- The audible exterior alarm will sound and can be shut off by pressing the silence push button.
- The visual exterior alarm will flash.
- Auxiliary alarm contact will signal a remote alarm device.

High Level (float): The liquid level rises above the "high" level.

- Floats become primary control.
- An indicator light on the inner-door will illuminate.
- The audible exterior alarm will sound and can be shut off by pressing the silence push button.
- The visual exterior alarm will flash
- Auxiliary alarm contact will signal a remote alarm device.

Seal Fail: Moisture breaks through the lower seal. Probes in the motor detect the moisture.

- An indicator light on the inner-door will illuminate.

***Note:** The seal fail condition can not be corrected without removing the motor from the wetwell and repaired.*

Overtemperature: The thermostat in the motor senses motor winding high temperature.

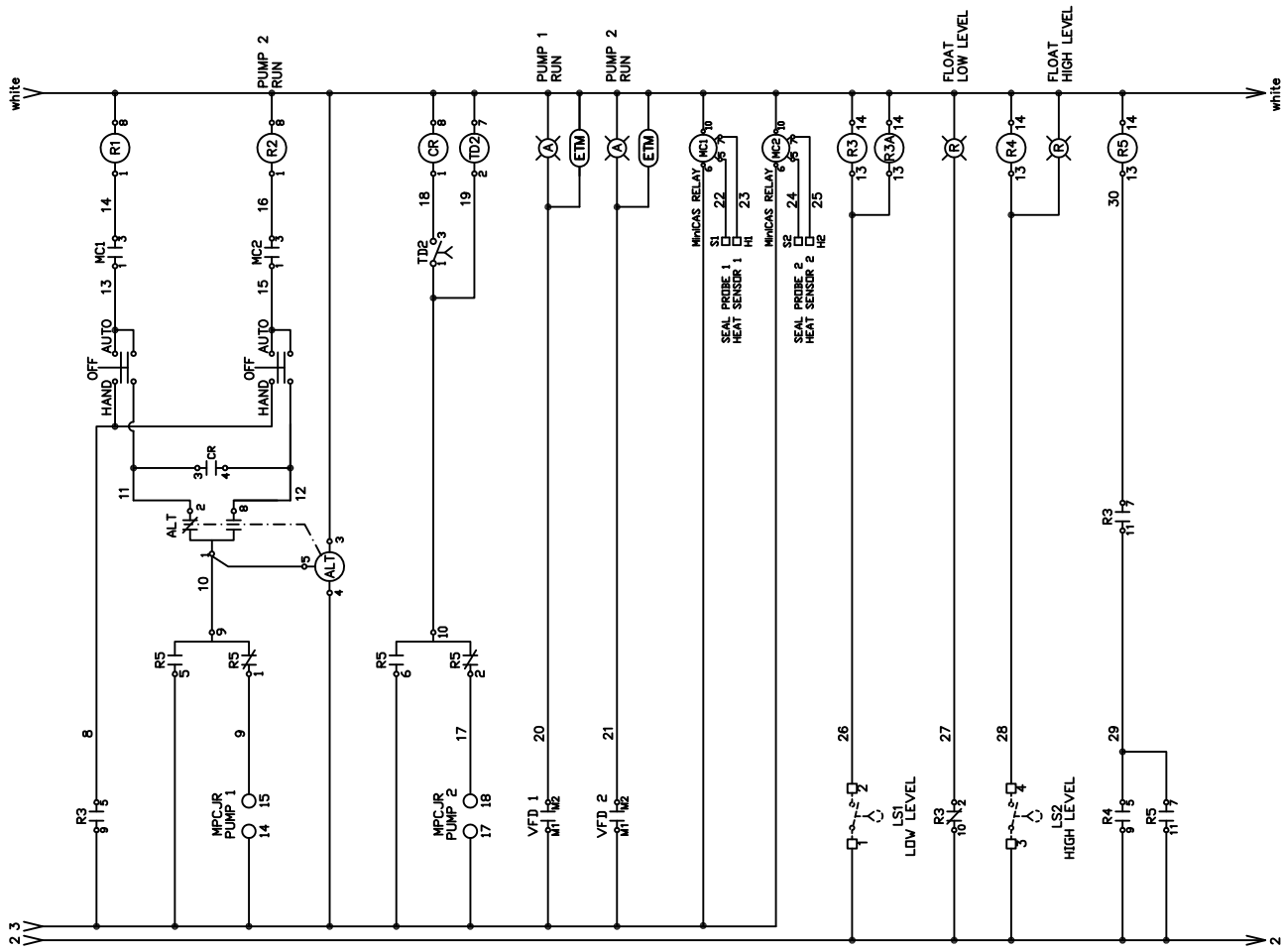
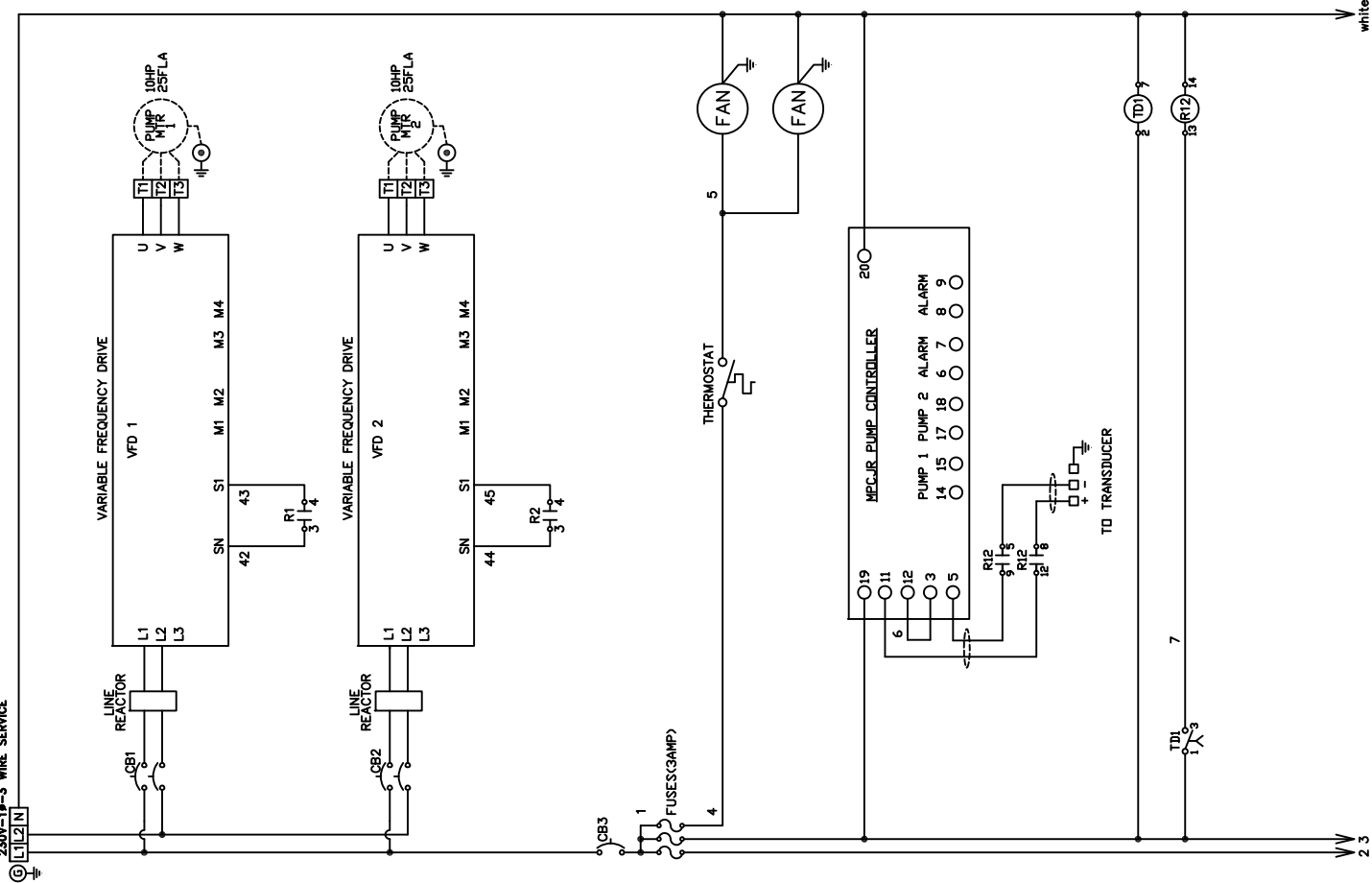
- The starter circuitry is interrupted and the motor stops.

***Note:** The thermostat in the motor will automatically reset.*

Pump Fail: The variable frequency drive has detected a failure.

- The starter circuitry is interrupted and the motor stops.
- An indicator light on the inner-door will illuminate.
- Auxiliary alarm contact will signal a remote alarm device.

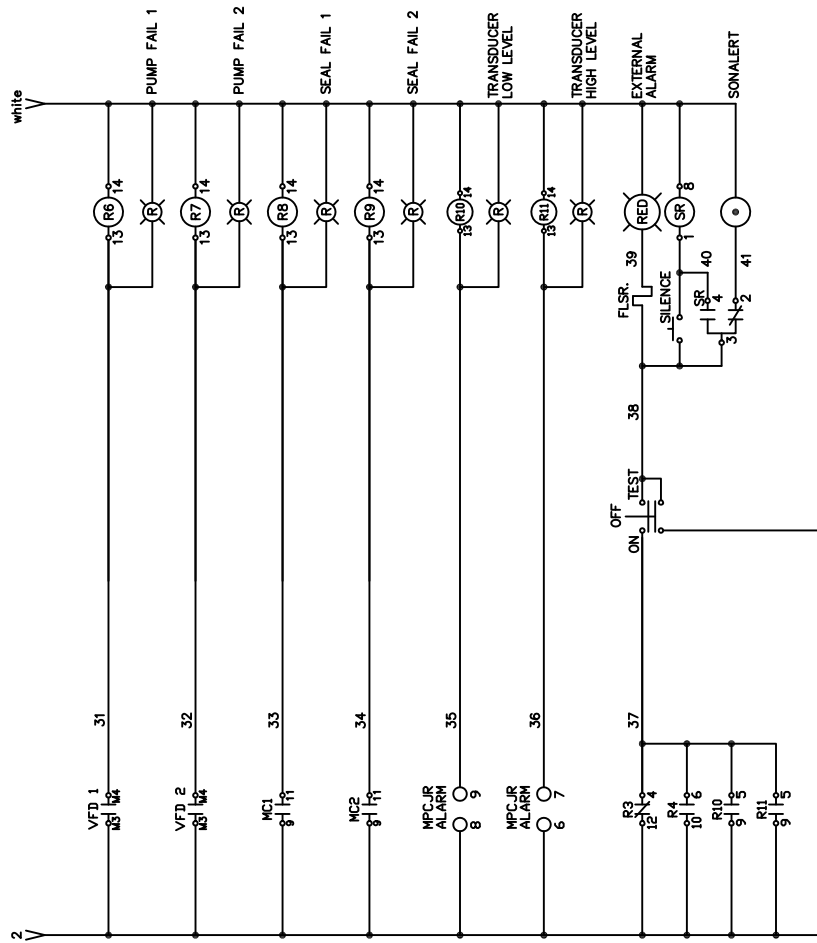
250V-1P-3 WIRE SERVICE



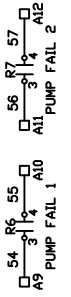
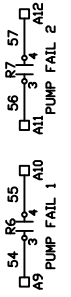
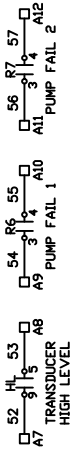
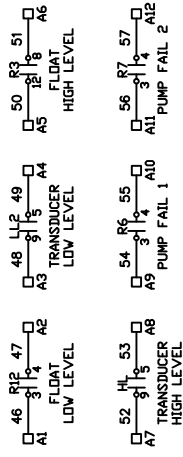
VOLTAGE:	PHASE:	HERTZ:	HP/FLA:	TITLE: SUMMER REACH-	
				PLYMOUTH	
230	1	60	10/25	JDP SHEET 1 OF 2	
ENCLOSURE TYPE: 3R			5P	DATE: 5-17	
SHORT CIRCUIT CURRENT: 5KA				REV DATE: 5-17	
RMS SYMMETRICAL, 240V MAXIMUM				DWG. NO.: 170327JB01A	



OHIO ELECTRIC CONTROL, INC.
2395 Rock Road
Ashland, Ohio 44805



AUX ALARM CONTACTS



NOTES:
1) FLUID SWITCHES MUST BE RATED A MINIMUM OF 2 AMPS AT 115 VOLTS.
2) TORQUE ALL WHITE 1/2" WIRING TERMINALS TO THE PROPER TORQUE AS FOLLOWS:

	FOR: #4-#18 AVG WIRE, TORQUE TO 20 IN.LBS.
3)	TORQUE ALL BLACK DEAD POINT TERMINAL BLOCKS TO 16 IN.LBS.
5)	USE 66C COPPER WIRE ONLY MINIMUM FOR LESS THAN 100 AMPS.
6)	USE 75C COPPER WIRE ONLY MINIMUM FOR 100 AMPS OR GREATER.
7)	ALL WIRE MUST BE SUPPLIED IN THE ENCLOSURE TYPE RATING INDICATED ON THE "UL" INFORMATION LABEL.

 OHIO ELECTRIC CONTROL, INC. 2395 Rock Road Ashland, Ohio 44805				TITLE: SUMMER REACH— PLYMOUTH	
VOLTAGE: 230	PHASE: 1	HERTZ: 60	HP/FLA: 10/25 ③ 3φ	JDP	SHEET 2 OF 2
ENCLOSURE TYPE: 3R				DATE: 5-17	REV. NO.: DWG. NO.: 170327UB01A
SHORT CIRCUIT CURRENT: 5KA					
RMS SYMMETRICAL, 240V MAXIMUM					

Control Panel Customer Submittal Form

Company: Xylem Inc. MA
Contact Name: Brendan Kennedy
Phone Number: 781-970-0021
Cell Number: 617-686-6538
E-mail / Fax: 781-938-0364
Job Name: Summer Reach - Plymouth

CONTROL PANEL SPECIFICATIONS:

Station Type: Duplex
Pump Model: Flygt - 10Hp @ 25FLA (42FLA Ph Conv)
Panel Voltage: 230V, 1Ø - (Ph Conv)
SCCR Minimum Rating: 5000 Amps
UL Listed: 508A
PDF Specs Attached: Yes

OTHER REQUIREMENTS:

Quantity	Part Number	Part Description	Construction Notes	Manufacturer
1.0	SCE60EL3616SSLP	ENCLOSURE - WALL MOUNTABLE	TYPE 3R - 304 STAINLESS STEEL - 60" X 36" X 16"	SAGINAW
1.0	SCE3PTL	3-POINT LATCH KIT		SAGINAW
1.0	SCEELPL	PADLOCKING HANDLE		SAGINAW
1.0	SCE60P36	BACK PANEL	PAINTED STEEL	SAGINAW
1.0	OEC60SD36	SUB DOOR	ALUMINUM	HARRIS
1.0	SCEDS36SS	SHIELD, S.S. DRIP		SAGINAW
1.0	SCEELMFK4SS	MOUNTING FOOT KIT		SAGINAW
1.0	11665154055	INTAKE FAN PF 65000	MOUNTED IN EXTERIOR BOTTOM LEFT SIDE OF ENCLOSURE	PFANNENBERG
1.0	11665154054	EXHAUST FAN - PF 6500 "A"	A REVERSE FLOW UNIT - MOUNTED IN EXTERIOR UPPER RIGHT SIDE OF ENCLOSURE	PFANNENBURG
2.0	18102000020	RAIN HOOD - PF-RH-60000-WD-SS	DE-RATES ENCLOSURE TO TYPE 3R	PFANNENBERG
2.0	18102000023	MESH AND SNOW PLUG KIT PF-RH-60000-KIT	INSTALL MESH AND SHIP SNOW PLUG LOOSE	PFANNENBERG
1.0	17121000010	THERMOSTAT		PFANNENBERG
1.0	1423570	POWER BLOCK	POWER DISTRIBUTION	MARATHON
2.0	985GP3	PUMP T-BLOCK		MARATHON

4.0	6G38TSF	PUMP SENSOR T-BLOCK	HEAT SENSOR/MOISTURE PROBE	MARATHON
1.0	1783790000	TRANSDUCER T-BLOCK	4-20MA SIGNAL FROM WET WELL	WEIDMULLER
1.0	1783800000	END PLATE		WEIDMULLER
4.0	6G38TSF	FLOAT T-BLOCK	2 FLOAT BACKUP SYSTEM	MARATHON
12.0	6G38TSF	AUX T-BLOCK	DRY CONTACT FOR REMOTE ALARM	MARATHON
2.0	GL4717	GROUND BAR	5 POSITIONS	LUGS DIRCT
2.0	QCR2060	PUMP CB1/CB2	MOUNTED THROUGH SUB DOOR	CUTLER HAMMER
1.0	QCR1010	CONTROL CB3	MOUNTED THROUGH SUB DOOR	CUTLER HAMMER
2.0	CIMRPU2A0056FAA	VFD	YASKAWA BRAND P1000	YASKAWA
2.0	KLRUL45BTB	LINE REACTOR		TCI
2.0	UUX000527	REMOTE MOUNT KEY PAD	MOUNTED ON SUB DOOR	YASKAWA
3.0	MDL3R	CONTROL/ALARM/FAN FUSES	3 AMP	BUSSMANN
3.0	MDL3R	SPARE FUSES	3 AMP, **SHIPPED LOOSE**	BUSSMANN
3.0	S82021	FUSE BLOCK		BUSSMANN
1.0	MPCJR	TRANSDUCER LEVEL CONTROLLER	DWYER MCP JR	DWYER
1.0	01002AA	PRESSURE TRANSDUCER	BIRDCAGE DESIGN, 10PSI, 40FT CORD, 3.75" FLANGE, **SHIPPED LOOSE** FOR FIELD INSTALLATION	BLUE RIBBON
2.0	RJ2SCA120	VFD CALL RELAY	R1/R2	IDEC
2.0	RU4SCA110	LOW LEVEL FLOAT RELAY	R3/R3A	IDEC
1.0	RU4SCA110	HIGH LEVEL FLOAT RELAY	R4	IDEC
1.0	RU4SCA110	FLOAT BACKUP RELAY	R5	IDEC
1.0	GE1AC10HA110	LAG TIME DELAY RELAY	TD2	IDEC
1.0	GE1AC10HA110	MPC JR TIME DELAY RELAY	TD1	IDEC
1.0	RY2SUAC120	MPC JR RELAY	R12	IDEC
2.0	14-407129	MINI CAS RELAY	CUSTOMER SUPPLIED, MOUNTED IN SUB DOOR	XYLEM
2.0	RU4SCA110	SEAL FAIL AUX ALARM RELAY	R8/R9	IDEC
2.0	RU4SCA110	PUMP FAIL ALARM RELAY	R6/R7	IDEC
1.0	RU4SCA110	TRANSDUCER LOW LEVEL RELAY	R10	IDEC
1.0	RU4SCA110	TRANSDUCER HIGH LEVEL RELAY	R11	IDEC
1.0	RJ2SCA120	SILENCE RELAY	SR	IDEC
2.0	SR2P06	8 PIN OCTAL RELAY SOCKET		IDEC
10.0	SY4S05	RU RELAY SOCKET		IDEC
1.0	SY2S05	RY RELAY SOCKET		IDEC
3.0	SJ2S05BW	RJ RELAY SOCKET		IDEC
2.0	HW1S3TF20	HAND/OFF/AUTO SWITCH	22MM OIL TIGHT MOUNTED IN SUB DOOR	IDEC

1.0	HW1S3TF20	ALARM ON/OFF/TEST SWITCH	22MM OIL TIGHT MOUNTED IN SUB DOOR	IDEC
1.0	HW1BM1F10B	SILENCE PUSHBUTTON	22MM OIL TIGHT MOUNTED IN EXTERIOR SIDE OF ENCLOSURE	IDEC
2.0	HW1P1FQDA120	PUMP RUN LAMP - AMBER	22MM OIL TIGHT MOUNTED IN SUB DOOR	IDEC
2.0	HW1P1FQDR120	PUMP FAIL LAMP - RED	22MM OIL TIGHT MOUNTED IN SUB DOOR	IDEC
1.0	HW1P1FQDR120	FLOAT LEVEL LAMP - RED	22MM OIL TIGHT MOUNTED IN SUB DOOR	IDEC
1.0	HW1P1FQDR120	TRANSDUCER LOW LEVEL LAMP - RED	22MM OIL TIGHT MOUNTED IN SUB DOOR	IDEC
1.0	HW1P1FQDR120	TRANSDUCER HIGH LEVEL LAMP - RED	22MM OIL TIGHT MOUNTED IN SUB DOOR	IDEC
1.0	HW1P1FQDR120	FLOAT HIGH LEVEL LAMP - RED	22MM OIL TIGHT MOUNTED IN SUB DOOR	IDEC
2.0	7220004-5003011	ELAPSED TIME METER	MOUNTED IN SUB DOOR	REDINGTON
1.0	RL3K	ALARM LIGHT	MOUNTED ON TOP CENTER OF ENCLOSURE	OEC
1.0	TEKRU075CW	FLASHER		AIROTRONICS
1.0	MW09201Q	ALARM SONALERT	MOUNTED IN BOTTOM OF ENCLOSURE	FLOYD BELL
1.0	ECQE2823JF	CAP FILM 0.082UF 250VDC RADIAL		OEC
1.0	508A	UL LABEL		UL
1.0	WIRE WAY	WIRE WAY		
1.0	WIRE NUMBERS	WIRE NUMBERS		
1.0	MISC SHOP MATERIALS	WIRING HARNESS		OEC
1.0	NOTE	WIRE COLOR CODE--->	COLOR CODE IS AS FOLLOWS:	OEC
1.0	NOTE	->	BLACK - AC POWER	OEC
1.0	NOTE	->	RED - AC CONTROL	OEC
1.0	NOTE	->	BLUE - DC CONTROL	OEC
1.0	NOTE	->	WHITE - AC NEUTRAL	OEC
1.0	NOTE	->	GREEN - GROUND	OEC
1.0	NOTE	->	YELLOW - POWERED FROM AN EXTERNAL SOURCE	OEC
1.0	NOTE			OEC
1.0	NOTE	AUXILIARY ALARM CONTACTS--->	DRY CONTACTS ARE AS FOLLOWS:	OEC
1.0	NOTE	->	LOW LEVEL ALARM (FLOAT)	OEC
1.0	NOTE	->	LOW LEVEL ALARM (TRANSDUCER)	OEC
1.0	NOTE	->	HIGH LEVEL ALARM (TRANSDUCER)	OEC
1.0	NOTE	->	HIGH LEVEL ALARM (FLOAT)	OEC
2.0	NOTE	->	PUMP FAIL ALARM	OEC
1.0	NOTE			OEC
1.0	NOTE	NOTE--->	SCHEMATIC PROVIDED IN POCKET ON ENCLOSURE DOOR.	OEC
1.0	NOTE			OEC

1.0	NOTE	NOTE--->	CUSTOMER SUPPLIED DEVICES MUST MEET UL REQUIREMENTS.	OEC
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Saginaw Control and Engineering
95 Midland Road Saginaw, MI 48638-5770
(800) 234-6871 - Fax: (989) 799-4524
SCE@SaginawControl.com

SCE-60EL3616SSLP

Product Specifications:

Part Number: SCE-60EL3616SSLP
Description: S.S. EL Enclosure
Height: 60.00"
Width: 36.00"
Depth: 16.00"
Price Code: S5
List Price: \$2,972.63
Catalog Page: 218
Est. Ship Weight: 195.00 lbs



Construction

- * 0.075 In. stainless steel Type 304.
- * Seams continuously welded and ground smooth.
- * Flange trough collar around all sides of door opening.
- * Oil-resistant gasket.
- * Collar studs provided for mounting optional panels.
- * Stainless steel concealed hinges.
- * Removable and interchangeable doors.
- * Black quarter turn latches.
- * Latches are opened or closed with a screwdriver (optional tamper-resistant inserts are available).
- * Mounting holes in back of enclosure.
- * Mounting hardware, sealing washer and hole plug included.
- * Removable print pocket furnished if height and width of enclosure is greater than 12 inches.
- * Ground studs on door and body.

Application

Designed to house electrical and electronic controls, instruments and components in areas which may be regularly hosed down or are in very wet conditions. Provides protection from dust, dirt, oil, and water. For outdoor applications a drip shield is recommended.

Options

Optional mounting feet available. Door hardware available.

Finish

#4 brushed finish on all exterior surfaces. Optional sub-panels are powder coated white.

Industry Standards - (IS6)

- * NEMA Type 3R, 4, 4X, 12 and Type 13
- * UL Listed Type 3R, 4, 4X and 12
- * CSA Type 4, 4X and 12
- * IEC 60529
- * IP 66

Notes

Provision for Lifting Lugs on enclosures when Height >48" and Depth >16". The Lifting Lug assembly will be included with the enclosure bolt pack.

Optional Accessories

- SCE-60P36 Subpanel, Bent
- SCE-BVK Breather Vent
- SCE-DF60EL36LP Panel, Dead Front (Wall Mount)
- SCE-DS36SS Shield, S.S. Drip
- SCE-ELMFK4SS Foot Kit, S.S. EL Mounting (4pc.)
- SCE-ELSP3 KIT, Swing-Out Panel (20 High & Up)

Similar Part Numbers

- SCE-48EL3612SSLP.S. EL Enclosure
- SCE-48EL3616SSLP.S. EL Enclosure
- SCE-60EL3612SSLP.S. EL Enclosure
- SCE-60EL3624SSLP.S. EL Enclosure
- SCE-72EL3016SSLP.S. EL Enclosure
- SCE-72EL3612SSLP.S. EL Enclosure
- SCE-72EL3616SSLP.S. EL Enclosure

Installation Information

- * Mounting Foot Kit for Enviroline Enclosures
- * EL Flush Mount Frame
- * Drip Shield Kit Assembly
- * Sealing Washer Specifications
- * Drain/Vents
- * Dead Front Wall Mount Installation Instructions
- * Swing Panel Assembly for Enviroline Enclosures
- * Dead Front Wall Mount < 20 In Height Installation Instructions
- * Swing Panel ELSP for Encl. Height > 16
- * Swing Panel ELSP for Encl. Height <= 16
- * Service Parts Wall Mount Enclosures



Saginaw Control & Engineering
95 Midland Road
Saginaw, MI 48603
Phone: (989)799-6871
Fax: (989)799-4524
<http://www.saginawcontrol.com>

Part Details - SCE-3PTL

Part Number: SCE-3PTL

Description: Kit, 3-point
Latch

Height: 48.00 inches

Width: 3.00 inches

Depth: 1.50 inches

Page Number: 197

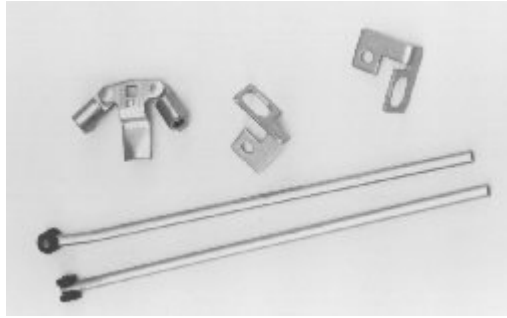
List Price: \$58.30

Product Code: P2

Est. Shipweight: 1.00 lbs.

NEMA Rating: N/A

Quantity Per Kit: 1



Having trouble downloading drawings? [Click Here](#) for help.

Installation Information -

- [Three Point Door Rod Kit](#)

Application -

Designed for use with all Enviroline Series enclosures. This latch kit will add a two or three point latching system to the enclosures with easy to cut and install rod guides and 5/16 inch round rods with rollers for a strong easy functioning latching system. No added holes or cutouts in enclosure necessary for installation.

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95 Midland Road
Saginaw, MI 48638
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<http://www.saginawcontrol.com>

Part Details - SCE-ELPL

Part Number: SCE-ELPL
Description: Padlocking L Handle
Height: 4.63 inches
Width: 1.10 inches
Depth: 2.63 inches
Page Number: 249
List Price: \$62.09
Product Code: P2
Est. Shipweight: 1.00 lbs.
NEMA Rating: N/A



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Part Details - SCE-60P36

Part Number: SCE-60P36
Description: Subpanel, Bent
Height: 57.00 inches
Width: 33.00 inches
Depth: 0.88 inches
Page Number: 225
List Price: \$189.89
Product Code: P3
Est. Shipweight: 58.00 lbs.
NEMA Rating: N/A
Edge Flanges: Four
Configuration: C



[Detailed Drawing \(PDF\)](#)
[Downloadable Drawing](#)
[3D STP Drawing \(NEW!\)](#)

Similar Partnumbers -

- [SCE-48P24](#)
- [SCE-48P30](#)
- [SCE-48P36](#)
- [SCE-48P42](#)
- [SCE-60BFP42](#)
- [SCE-60P24](#)
- [SCE-60P30](#)
- [SCE-60P42](#)
- [SCE-60P48](#)
- [SCE-64P25](#)
- [SCE-64P31](#)
- [SCE-64P37](#)
- [SCE-72P30](#)
- [SCE-72P36](#)

Having trouble downloading drawings? [Click Here](#) for help.

Finish -

Powder coated white epoxy polyester.

Options -

Sub-plates can be special ordered in Stainless Steel or Galvanized material. Please consult a factory representative for assistance.

Installation Information -

- [Sub-Plate Layout & Grounding](#)

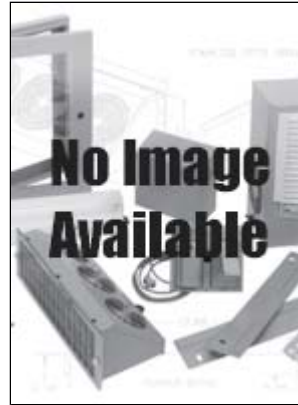
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Part Details - SCE-DS36SS

Part Number: SCE-DS36SS
Description: Shield, S.S. Drip
Height: 36.00 inches
Width: 3.00 inches
Depth: 1.00 inches
Page Number: 253
List Price: \$129.14
Product Code: P2
Est. Shipweight: 4.00 lbs.
NEMA Rating: N/A
Fits Enclosure Width B: 36.00



Similar Partnumbers -

- [SCE-DS24SS](#)
- [SCE-DS30SS](#)
- [SCE-DS42SS](#)
- [SCE-DS48SS](#)

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Application -

Protects door against dripping water and settling dust. Furnished with stainless steel screws and sealing washers, and a tube of sealing compound. Kit made of stainless steel Type 304.

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Your Enclosure Source®

Saginaw Control & Engineering
95 Midland Road
Saginaw, MI 48638-5770
Phone: (800)234-6871
Fax: (989)799-4524
<http://www.saginawcontrol.com>

Part Information - SCE-ELMFK4SS

■ SCE-ELMFK4SS

Application -

Made for use with all SCE Enviroline enclosures and two-door wall-mount enclosures. Chemical and Corrosion resistant Polyamide material rated for type 3, 3R, 4, 4X and 12. Available in kits of four or six, and with plated steel fastener or stainless steel fasteners to maintain type 3, 3R, 4, 4X and 12 rating of your enclosure.

Industry Standards - (IS17)

NEMA Not Applicable
UL Not Applicable
CSA N/A

Product Specifications -

Part Number: SCE-ELMFK4SS
Description: Foot Kit, S.S. EL Mounting (4pc.)
Height: 5.00"
Width: 3.00"
Depth: 1.25"
Price Code: P2
List Price: \$26.05
Catalog Page: 305
Est. Ship Weight: 2.00 lbs
Feet Per Kit: 4
Kits Per Package: 1



[Download CAD Package](#)
[Add to Bill of Material](#)

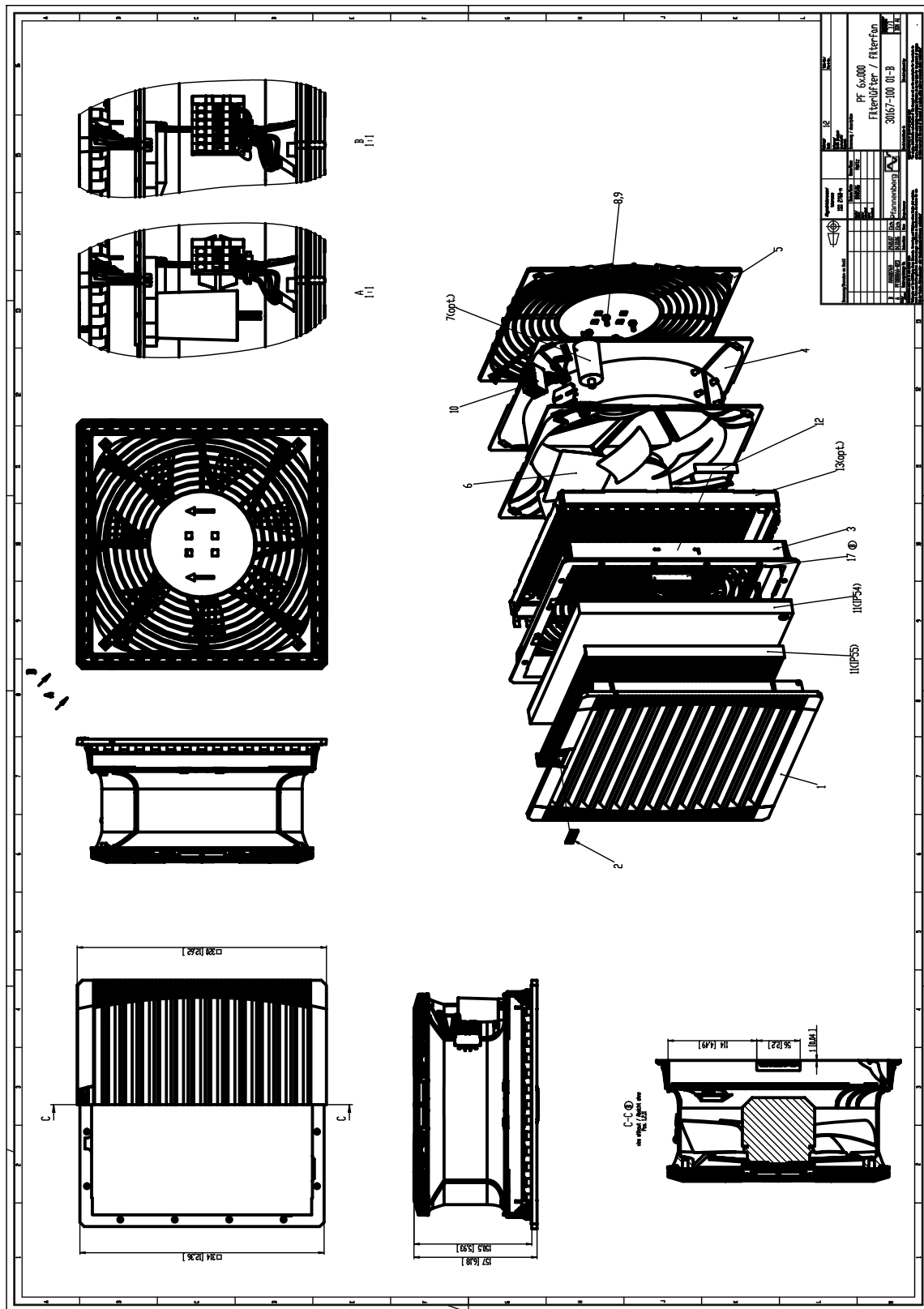
Similar Part Numbers -

[SCE-ELMFK4](#) - Foot Kit, EL Mounting (4pc.)
[SCE-ELMFK6](#) - Foot Kit, EL Mounting (6pc.)
[SCE-ELMFK6SS](#) - Foot Kit, S.S. EL Mounting (6pc.)
[SCE-ELMFK4-25](#) - Foot Kit, EL Mounting (4pc.) - Bulk
[SCE-ELMFK4SS-25](#) - Foot Kit, S.S. EL Mounting (4pc.) - Bulk

Installation Information -

[Mounting Foot Kit for Enviroline Enclosures](#)
[Mounting Foot Kit for WFLP Enclosures](#)

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95 Midland Road
Saginaw, MI 48638-5770
(800)234-6871
Fax: (989)799-4524
SCE@SaginawControl.com



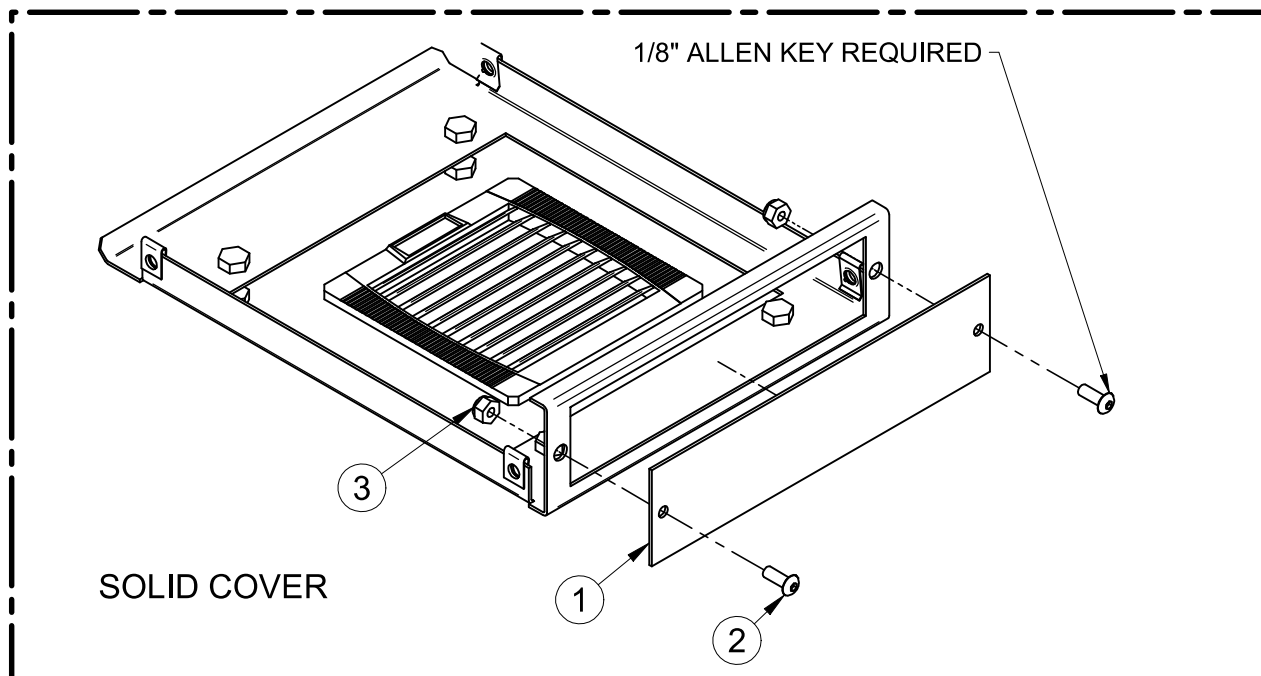
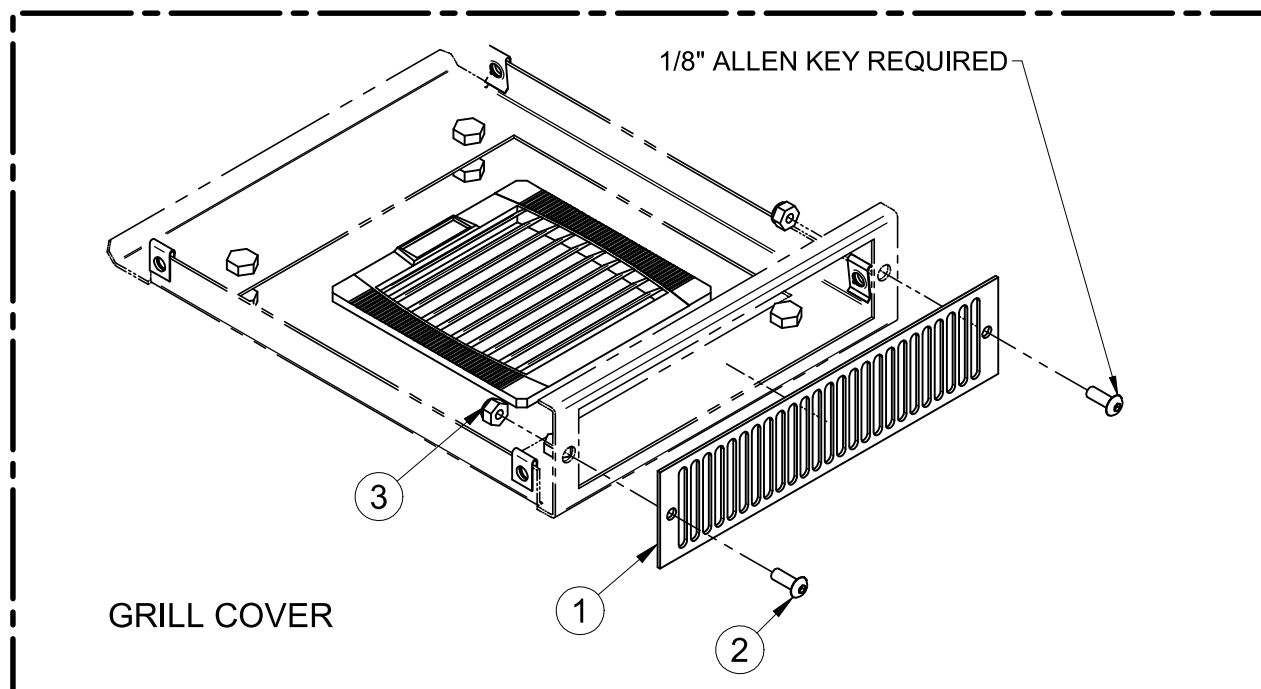
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RHA - GRILL/SOLID COVER KIT

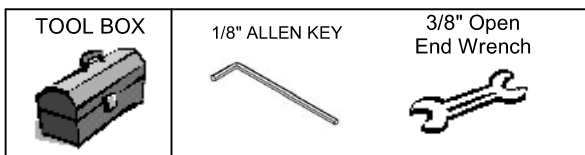
BUL86019

REV. B



A) Fasten Grill/Solid Cover to the bottom of the rainhood using hardware provided.

PART #	QTY.	DESCRIPTION
1	1	GRILL/SOLID COVER
2	2	SCREW 10-32 BUTTON HEAD, SS
3	2	NUT 10-32 NYLON INSERT, SS



18102000023

PF 22000

Filterfan®

PFA 20000

Exhaust filter

- Installation size 2, air flow rate up to 38 CFM
- System of protection IP 55, NEMA Type 12
- UL, cUL to NITW2 Category and CE approved, CSA pending
- Cut-out compatible with installation size 2 from the 3rd Generation (see page 159)



Options:

- UV-resistance / EMC, consult factory for part numbers

Data	PF 22000						Unit
Part number	RAL 9011 (Black Grill)	11622104050	11622154050	11622854050	11622804050	1162704050	
	RAL 7035 (Lt. Gray Grill)	11622104055	11622154055	11622854055	11622804055	1162704055	
	AC 50 Hz / 60 Hz			DC			
Rated voltage ± 10 %	230	115	12	24	48		V
Unimpeded airflow (CFM2)	38 (64)						CFM (m³/h)
Air flow rate in combination (PF + PFA 20000) (CFM3)	28 (46)						
Power consumption	19 / 18	20 / 20	5	5	5		W
Current consumption	0.12 / 0.18	0.24 / 0.23	0.42	0.21	0.1		A
Noise level (according to EN ISO 3741)	44 / 44			44			
Weight	1.5 (0.7)			.97 (0.44)			lb (kg)
Type of connection	terminal strip			cable, 2-core, length 310 mm			
Fuse (Recommended)	6						A
System of protection according to EN 60529 / UL 50	NEMA Type 12 - fluted filter / IP 55						
Filtration efficiency	91						%
Filter mat quality class¹	G 4						
Duty cycle	100						%
Bearing type	sleeve bearing			ball bearing			
Service life L ₁₀ (+ 40 °C)²	37500	40000	62500				h
Temperature range	+ 5 ... + 131 / - 15 ... + 55						°F / °C
Material Protection Rating	made of injection-molded thermoplastic, self-extinguishing, UL 94 VO, UV-resistant optional						

Accessories	Piece	Part number	Information on page
Exhaust filter PFA 20000 RAL 9011 (Black Grill)	1	11720004050	164
RAL 7035 (Lt. Gray Grill)	1	11720004055	164
Thermostat FLZ 530° F	1	17121000010	174

¹ according to DIN EN 779

² fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary
Approvals see page 132

Power Distribution Blocks

600 Volts

Specifications:

- Connector, High Conductive Aluminum, Tin Plated
- Amp Rating Based on NEC Table 310-16 Using 75° C Copper Wire
- *Wire Connector Rated 90° C
- UL Recognized File No. E62806
- CSA Certified File No. LR19766
- CE



** Openings rated for #4-14 AWG are multiple wire rated:
(2) #10 CU Str, (2 to 4) #12 CU Str, and (2 to 4) #14 CU Str.

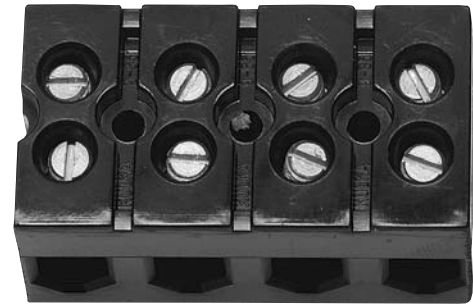
*** Openings rated for #2-14 AWG are multiple wire rated:
(2) #8 CU Str, (2) #10 CU Str, (2) #12 CU Str, And
(2) #14 CU Str

Catalog #	Poles	Amps	Material	Connector Configuration	Line Wire Range	Openings Per Pole	Connector Configuration	Load Wire Range	Openings Per Pole
1411403	1	60	Thermoplastic		#2-#14 AWG	1		#10-#18 AWG	2
1412403	2								
1413403	3								
1414403	4								
1411400	1	115	Thermoplastic		#2-#14 AWG	1		#10-#18 AWG	4
1412400	2								
1413400	3								
1414400	4								
1320570	Adder	175	Thermoplastic		2/0-#14 AWG	1		** #4-#14 AWG	4
1321570	1								
1322570	2								
1323570	3								
1421570	1	175	Phenolic		2/0-#14 AWG	1		** #4-#14 AWG	4
1422570	2								
1423570	3								
1320580	Adder								
1321580	1	175	Thermoplastic		2/0-#14 AWG	1		** #4-#14 AWG	6
1322580	2								
1323580	3								
1402402	2								
1403402	3	175	Phenolic		2/0-#14 AWG	1		** #4-#14 AWG	4
1402401	2								
1403401	3								
1402404	2								
1403404	3	310	Phenolic		350 kcmil - #6 AWG	1		#2/0-#14 AWG	6
1331554	1								
1332554	2								
1333554	3								
1441401	1	335	Phenolic		400 kcmil - #6 AWG	1		#2-#14 AWG	6
1442401	2								
1443401	3								
1431552	1								
1432552	2	335	Phenolic		400 kcmil - #6 AWG	1		#2-#14 AWG	4
1433552	3								
1431553	1								
1432553	2								
1433553	3	335	Phenolic		400 kcmil - #6 AWG	1		#2-#14 AWG	6
1441560	1								
1442560	2								
1443560	3								
1331552	1	335	Thermoplastic		400 kcmil - #6 AWG	1		*** #2-#14 AWG	4
1332552	2								
1333552	3								

Heavy Duty Terminal Blocks

985 GP Series - Deadfront Type

600 Volts

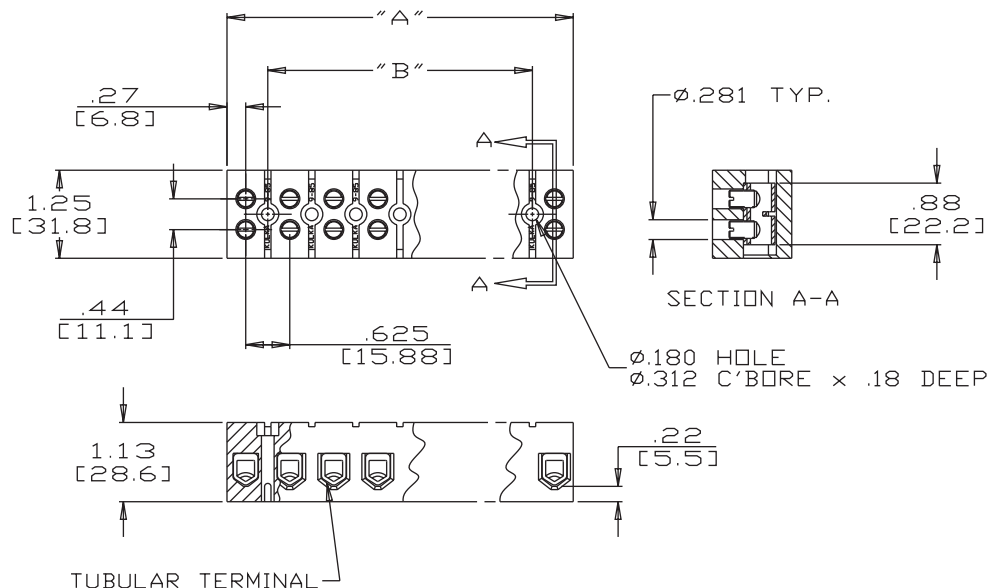


Specifications:

- Base, General Purpose Phenolic, 150° C
- Connector, Aluminum, Tin Plated
- Screws, Steel, Nickel Plated
- Wire Range #4-#18 Awg Copper Wire – 85 Amps
- Multiple Wire Combinations For Solid Or Stranded Copper Wire Are:
 - 1 #18 Awg to 1 #4 Awg
 - 2 #8 Awg
 - 2 to 4 #10 Awg
 - 2 to 4 #12 Awg
 - 2 to 6 #14 Awg
 - 2 to 6 #16 Awg
 - 2 to 8 #18 Awg
- .625 Center-Line Spacing
- UL Recognized File No. E47811
- CSA Certified File No. LR19766
- **CE** - Wire Range Reduced #6-#18 Awg

Catalog #	# of poles	Dimensions	
		A	B
985 GP 02	2	1.16	N/A
985 GP 03	3	1.78	0.63
985 GP 04	4	2.41	1.25
985 GP 05	5	3.03	1.88
985 GP 06	6	3.66	2.50
985 GP 07	7	4.28	3.13
985 GP 08	8	4.91	3.75
985 GP 09	9	5.53	4.38
985 GP 10	10	6.16	5.00
985 GP 11	11	6.78	5.63
985 GP 12	12	7.41	6.25

MM = Dim X 25.4

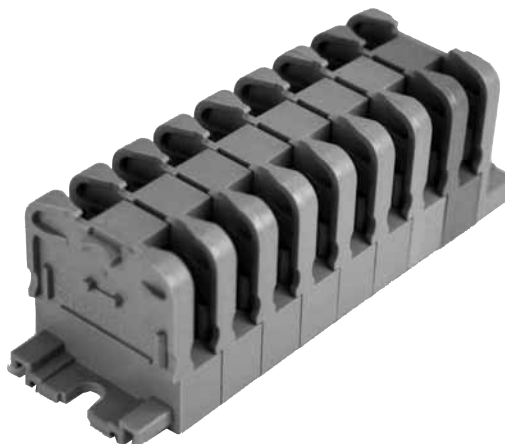


3/8" Sectional - 600 Volts 32 Circuits Per Foot

Channel (C), Flat (F) & (DIN) Mount

Specifications:

- UL Recognized File No. XCFR2.E62806
- CSA Certified File No. LR 19766
- Wire termination torque 16 lb-in
- C€



Tubular Screw Connector (6G38 TS)

Materials:

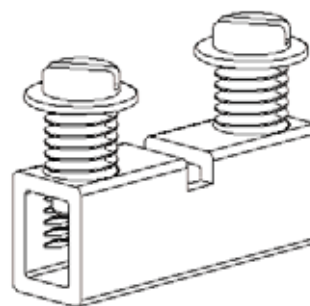
Base - Gray Thermoplastic, 125°C (RTI)
Tubular Screw Connector- Copper, Tin Plated
Screw - #10-32 Steel, Nickel Plated
50 Amps (40 Amps CSA)

Wire Ranges:

Single and Multiple Wire Combinations:

Stranded CU
(1) #8 - 18 AWG
(1-3) #12 AWG
(1-4) #14

Solid CU
(1) #10 - #16 AWG
(1-3) #12 AWG
(1-4) #14 or #16 AWG



Ordering Code:

6G38 TS F
6G38 TS C
6G38 TS DIN

For flat mount block
For channel mount block
For DIN mount block

Std pk 100
Std pk 100
Std pk 25

See Figure 2 On Page 116
See Figure 1 On Page 116
See Figure 3 On Page 116

Initiator and actuator terminals

Time- and space-saving wiring for initiators and actuators. All the connections for initiator and actuator are in one terminal.

In hazardous area applications, the installation instructions and the rated data specifications for accessories given in the technical appendix must be followed.

Width/Length/height with TS35x7.5	mm
max. current / max. cond. cross-section	A/mm ²
Max. clamping range	mm ²

Technical data

Rated data	
Rated voltage	V
Rated current	A
Rated cross-section	mm ²
Rated impulse voltage / Pollution severity	kV/-
Gauge to IEC 60947-1 / UL94 Flammability class	
Approvals	
Electronic fixtures	
Component voltage / Component current	V/A
Operating voltage for display, max. / Current	V/A
Clamped conductors (H05V/H07V)	
solid / stranded	mm ²
flexible / Stranded wire with end ferrules	mm ²
Tightening torque range (clamping screw)	
Stripping length / Blade size	mm/-
Note	

Ordering data

Version	
Dark beige Wemid	
Dark beige Wemid (red LED)	
Dark beige Wemid (green LED)	
Note	

Accessories

Screwable cross-connection	
2-pole	
3-pole	
4-pole	
10-pole	
End plate / partition	
Dark beige Wemid	
End bracket	
Dark beige Wemid	
Screwdriver	
Standard	

Marking systems (see assortment in catalogue 7)

Marking tags

For detailed information on other accessories and applications, refer to the „Accessories“ section

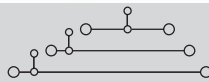
DLD 2.5

2.5 mm²

Voltage supply



6.1 x 82.5 x 49
24 / 4
0.13...4



IEC 60947-7-1

IEC	UL	CSA
250	300	300
24	10	10
2.5	AWG 22...12	AWG 26...12
	4 / 3	
	A3 / V-0	



Rated connection

0.5...4 / 1.5...4
0.5...4 / 0.5...2.5
0.4...0.6 Nm (M 2.5)
7 / 0.6 x 3.5 mm

Rated voltage is reduced to 30 V AC when one pole with a different potential is skipped with a cross-connector.

Type	Qty	Order No.
DLD 2.5 DB	50	1784180000
Blue version order No. 6269250000 (50 pcs)		

Type	current	Qty	Order No.
Q 2 DLI	20 A	50	1312500000
Q 3 DLI	20 A	50	1312600000
Q 4 DLI	20 A	50	1312700000
Q 10 DLI	20 A	20	1313100000
Width			
AP DLD2.5 DB	1.5 mm	20	1784210000
EW 35	8.5 mm	50	0383560000
SD 0.6x3.5x100		1	9008330000

DEK 5/6

Insulation plate TSCH 1 order No. 0319160000 (100 pcs)
Partial end plate TEAP DLD2.5/PE DB order No. 1783810000 (20 pcs)

DLD 2.5 PE

2.5 mm²

Lower level earthed



6.1 x 74.5 x 49
17.5 / 4
0.13...4



IEC 60947-7-1

IEC	UL	CSA
250	300	300
17.5	10	10
2.5	AWG 26...12	AWG 26...12
	4 / 3	
	A3 / V-0	



Rated connection

0.5...4 / 0.5...4
0.5...4 / 0.5...2.5
0.4...0.6 Nm (M 2.5)
7 / 0.6 x 3.5 mm

Rated voltage is reduced to 30 V AC when one pole with a different potential is skipped with a cross-connector.

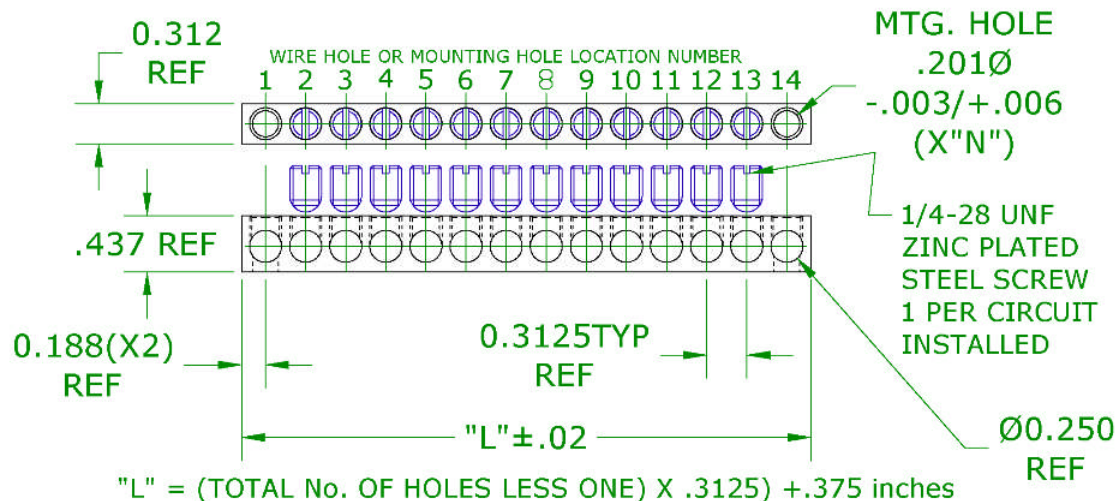
Type	Qty	Order No.
DLD 2.5/PE DB	50	1783790000

Type	current	Qty	Order No.
Q 2 DLI	20 A	50	1312500000
Q 3 DLI	20 A	50	1312600000
Q 4 DLI	20 A	50	1312700000
Q 10 DLI	20 A	20	1313100000
Width			
AP DLD2.5/PE DB	1.5 mm	20	1783800000
EW 35	8.5 mm	50	0383560000
SD 0.6x3.5x100		1	9008330000

DEK 5/6

Insulation plate TSCH 1 order No. 0319160000 (100 pcs)
Partial end plate TEAP DLD2.5/PE DB order No. 1783810000 (20 pcs)

STANDARD STOCK NEUTRAL BARS WITH MOUNTING HOLES



[Back to Top](#)

UL & CSA AGENCY APPLICATION NOTES:

- UL Recognized ("UR" mark) Class ZMVV2 and "CSA" Certified (CSA mark)
- Installation must be carried out only by qualified electricians in accordance with all applicable NEC & UL/CSA standards for the approved application.
- Approved for 90 ° C Temperature Rating Wire, CU9AL
- Amp Rated at 85 Amps for Copper wire and 70 Amps for Aluminum wire
- Wire range, American Wire Gauge AWG 4-14 CU (copper wire), 4-12 AL (aluminum wire) Dual Rated, Solid & Stranded, industrial rigid stranding wire.
- Tightening torques, 4-6 AWG = 45 lb-in, 8 AWG = 40 lb-in, 10-14 AWG = 35 lb-in
- The bar shall be prevented from turning by close fitting walls, or other turn preventive features such as two mounting holes.
- The bar shall not be mounted to a bus bar to act as a power distribution means to or from that bar.
- The bar is designed to be used as a neutral bar for ground or power.
- The bar is for use only in complete equipment where the suitability of the combination is determined & approved by UL
- The mounting screw is to be size #10-32 UNF. The proper use of washers to distribute screw clamping forces on the aluminum should be employed. Bellevilles and lock nuts should be considered in case of vibration.
- The screw will hold the smaller wires when the appropriate torque for the small wire is fully applied
- Dry locations only.

CONSTRUCTION NOTES:

- The tolerance between mounting holes is +/- .015"
- The mounting hole is .201 +.006/- .003.
- The listed overall length of each bar is +/- .020
- Material is High Strength Tempered aluminum 6160 with conductivity approx. 43% IACS.
- Aluminum body is Tin Plated to resist oxidation and galvanic corrosion.
- Screws are Zinc Plated Steel with Trivalent (Cr+3) Chromate conversion top layer.

GL4717

Product Selection

Table 11-16. QCR Breaker Catalog Numbers ①②③④

Continuous Ampere Rating at 40°C	120/240 Vac		120/240 Vac		240 Vac ⑤		240 Vac ⑤	
	1-Pole		2-Pole		2-Pole		3-Pole	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
QCR Breaker 10 kAIC Interrupting Ratings								
10	QCR1010 QCR1010T —	CB3	QCR2010 QCR2010T QCR2010P	—	—	—	—	—
15	QCR1015 ⑥ QCR1015T ⑥ —	—	QCR2015 QCR2015T QCR2015P	—	QCR2015H QCR2015HT —	—	QCR3015H QCR3015HT —	—
20	QCR1020 ⑥ QCR1020T ⑥ —	—	QCR2020 QCR2020T QCR2020P	—	QCR2020H QCR2020HT —	—	QCR3020H QCR3020HT —	—
25	QCR1025 QCR1025T —	—	QCR2025 QCR2025T QCR2025P	—	QCR2025H QCR2025HT —	—	QCR3025H QCR3025HT —	—
30	QCR1030 QCR1030T —	—	QCR2030 QCR2030T QCR2030P	—	QCR2030H QCR2030HT —	—	QCR3030H QCR3030HT —	—
35	QCR1035 —	—	QCR2035 QCR2035P	—	—	—	—	—
40	QCR1040 —	—	QCR2040 QCR2040P	—	—	—	—	—
45	QCR1045 —	—	QCR2045 QCR2045P	—	—	—	—	—
50	QCR1050 —	—	QCR2050 QCR2050P	—	—	—	—	—
55	QCR1055 —	—	QCR2055 QCR2055P	—	—	—	—	—
60 ⑦	QCR1060 —	—	QCR2060 QCR2060P	CB1/CB2	—	—	—	—
QCR Breaker 22 kAIC Interrupting Ratings								
15	QCRH1015 ⑥ QCRH1015T ⑥	—	QCRH2015 QCRH2015T	—	—	—	—	—
20	QCRH1020 ⑥ QCRH1020T ⑥	—	QCRH2020 QCRH2020T	—	—	—	—	—

① Standard breaker terminals are box type lugs.

② Breakers with T Catalog Number Suffix are suitable for line and load side ring terminal connection (#10 – 32 plus/minus terminal screw provided).

③ Breakers with P Catalog Number Suffix are suitable for terminating two 10 AWG Quick-Connect Type Terminals per phase on breaker load side.

④ Breakers with Shunt Trip (extra pole required on breaker right-hand side) are available on 1-, 2- and 3-pole. Contact the Customer Support Center at 1-800-356-1243.

⑤ Breakers with H Catalog Suffix have 240 Vac construction.

⑥ All 15 and 20 ampere single-pole breakers are SWD (Switching Duty) rated for fluorescent lighting applications.

⑦ 60/75°C Cu/Al wire on all ratings except 60 amperes which requires Cu only conductor.

Discount Symbol CB-1



P1000 Industrial Fan and Pump Drive

240V Class: $\frac{3}{4}$ to 175 HP

480V Class: 1 to 1000 HP

600V Class: 2 to 250 HP



The P1000 is the next generation in Industrial Fan and Pump control, designed specifically for variable torque applications. Simple to use, intuitive, and user friendly are key features in the P1000 design. The P1000 supports a wide range of network and control options providing for the most flexible and cost-effective solution.

LCD Operator with Real Time Clock

5-line, 16-character alpha-numeric display with time and date stamping for events, along with timer controls for starting, stopping, and speed changes without the need for external controls.

Application Macros

Choose from pre-configured fan and pump setup macros to match the application for quick and easy set up.

Selectable and Custom Engineering Units

Allows for easy configuration of keypad display to match process and feedback devices such as PSI, GPM, Feet.

Underload Detection

Monitors load and will shut system down in the event of a fan belt or pump shaft breakdown.

Parameter Storage and Removable Terminal Board

Allows for easy replacement of control card without removing control wires, and stores all drive settings without the need for a copy device.

PI Process Control

Maintains a set point for closed loop control of fans and pumps for pressure, flow, or temperature regulation, and eliminates the need for a closed loop output signal from a process controller. Independent PI to control an external device in the system.

Power Quality

Built-in DC reactors (30 HP and larger) provide input harmonics benefit, and protection from input disturbances. Integrated 12 Pulse version (480V, 40 HP and larger) provides a cost-effective solution for low harmonics.

Dynamic Noise Control

Monitors the load at all times and reduces the output voltage automatically, reducing motor audible noise.

Networking Options

Industrial Communication

- Modbus RTU (built-in)
- DeviceNet
- EtherNet/IP
- Modbus TCP/IP
- PROFIBUS-DP
- PROFINET

Building Automation Networks (BAS)

- BACnet
- Lonworks
- Metasys (N2)
- Apogee (P1)

Note: All communication protocols are by option card mounted within drive.

Specifications

Overload Capacity

- 120% for 60 seconds

Output Frequency

- 0.01 to 400 Hz

Control Methods

- V/Hz Control

Enclosure Solutions

- Open Type / IP00
- NEMA Type 1 (kit required for some models)
- Flange Type (front = Open/IP00, back = NEMA Type 12)

Power Solutions

- Six Pulse (Standard)
 - 240V: $\frac{3}{4}$ to 175 HP
 - 480V: 1 to 1000 HP
 - 600V: 2 to 250 HP
- Twelve Pulse (Low Harmonic)
 - 480V: 40 to 1000 HP

Ambient Operating Temperature

- -10°C to 40°C (14°F to 104°F)

Global Certification

- UL, CSA, CE, RoHS, C-Tick

Standard I/O

- (8) multi-function digital inputs (24Vdc)
- (3) multi-function analog inputs (0-10Vdc, 4-20 mA)
- (1) multi-function pulse input
- (1) fault relay output (form C)
- (1) multi-function relay (form C)
- (2) multi-function relay outputs (form A)
- (2) multi-function analog outputs (0 +/- 10Vdc, 4-20 mA)
- Sensor feedback power supply (+24Vdc @ 150 mA supply)
- 120V converter for 8 standard digital inputs (option)



P1000 Industrial Fan and Pump Drive

240V Class: ¾ to 175 HP

480V Class: 1 to 1000 HP

600V Class: 2 to 250 HP

200-240V / 3-Phase

Model Number CIMR-PU	Rated Output Current (Amps)	HP	Dimensions (in.)		
			H	W	D
2A0004FAA	3.5	3/4	11.81	5.51	5.79
2A0006FAA	6.0	1			
2A0008FAA	8.0	2			
2A0010FAA	9.6	3			
2A0012FAA	12.0	3			6.46
2A0018FAA	17.5	5			
2A0021FAA	21.0	7.5			
2A0030FAA	30.0	10			
2A0040FAA	40.0	15	6.57		
2A0056FAA	56.0	20			
2A0069FAA	69.0	25	13.39	7.09	7.36
2A0081FAA	81.0	30	15.75	8.66	7.76
2A0110FAA	110	40	21.02	10.00	10.16
2A0138FAA	138	50	24.17	10.98	
2A0169FAA	169	60	28.74	12.95	11.14
2A0211FAA	211	75			
2A0250AAA	250	100	27.76	17.72	12.99
2A0312AAA	312	125			
2A0360AAA	360	150	31.50	19.69	13.78
2A0415AAA	415	175			

380-480V / 3-Phase

Model Number CIMR-PU	Rated Output Current (Amps)	HP	Dimensions (in.)		
			H	W	D
4A0002FAA	2.1	1	11.81	5.51	5.79
4A0004FAA	4.1	2			
4A0005FAA	5.4	3			
4A0007FAA	6.9	4			
4A0009FAA	8.8	5			6.46
4A0011FAA	11.1	7.5			
4A0018FAA	17.5	10			6.57
4A0023FAA	23.0	15			
4A0031FAA	31.0	20	13.39	7.09	7.36
4A0038FAA	38.0	25			
4A0044FAA	44.0	30	15.75	8.66	7.76
4A0058FAA	58.0	40	18.31	10.00	10.16
4A0072FAA	72.0	50	20.28	10.98	
4A0088FAA	88.0	60	24.80	12.95	
4A0103FAA	103	75			
4A0139FAA	139	100	28.74		11.14
4A0165FAA	165	125			
4A0208AAA	208	150	27.76	17.95	12.99
4A0250AAA	250	200	31.50	19.84	13.78
4A0296AAA	296	250			
4A0362AAA	362	300	37.40	19.69	14.57
4A0414AAA	414	350			
4A0515AAA	515	400 - 450	44.88	26.38	
4A0675AAA	675	500 - 550			
4A0930AAA	930	600 - 800	54.33	49.21	
4A1200AAA	1200	1000			

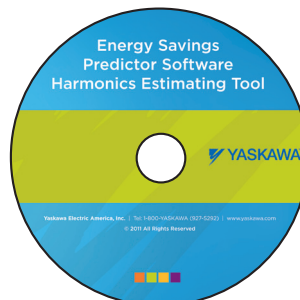
500-600V / 3-Phase

Model Number CIMR-PU	Rated Output Current (Amps)	HP	Dimensions (in.)		
			H	W	D
5A0003FAA	2.7	1 - 2	11.81	5.51	5.79
5A0004FAA	3.9	3			
5A0006FAA	6.1	5			6.46
5A0009FAA	9.0	7.5			
5A0011FAA	11.0	10			6.57
5A0017FAA	17.5	15	13.39	7.09	7.36
5A0022FAA	22.0	20	15.75	8.66	7.76
5A0027FAA	27.0	25			
5A0032FAA	32.0	30	20.28	10.98	10.16
5A0041FAA	41.0	40			
5A0052FAA	52.0	50	28.74	12.95	11.14
5A0062FAA	62.0	60			
5A0077FAA	77.0	75			
5A0099FAA	99.0	100	37.8	17.95	12.99
5A0125AAA	125	125			
5A0144AAA	144	150			
5A0192AAA	192	200	45.98	19.84	13.78
5A0242AAA	242	250			

VFD 1/VFD 2

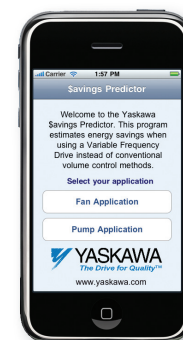
FREE Estimating Tools via
www.yaskawa.com

- Energy Savings Predictor
- Harmonics Estimator
- Carbon Footprint Calculator



iTunes App

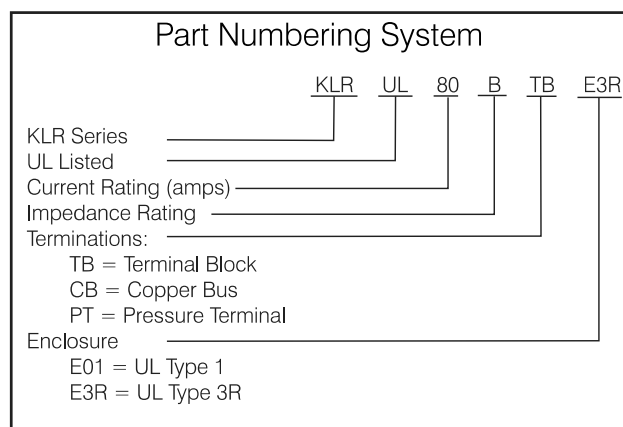
Energy savings app for the iPhone and the iPod touch is available at iTunes.com - search for Yaskawa.



KLR Series Three Phase Reactors

	Part Number	NEC Motor HP		Rated Amps	Watts Loss	UL Type 1 Enclosed		UL Type 3R Enclosed	
		480V	240V			Part Number *		Part Number *	
480 V - 1.5% Z	KLRUL2BTB	1	-	2	4	KLRUL2BTBE01		KLRUL2BTBE3R	
	KLRUL3BTB	1.5	0.5	3	5	KLRUL3BTBE01		KLRUL3BTBE3R	
	KLRUL4BTB	2	0.75	4	9	KLRUL4BTBE01		KLRUL4BTBE3R	
	KLRUL6BTB	3	1-1.5	6	9	KLRUL6BTBE01		KLRUL6BTBE3R	
	KLRUL8BTB	5	2	8	14	KLRUL8BTBE01		KLRUL8BTBE3R	
	KLRUL12BTB	7.5	3	12	20	KLRUL12BTBE01		KLRUL12BTBE3R	
	KLRUL16BTB	10	5	16	20	KLRUL16BTBE01		KLRUL16BTBE3R	
	KLRUL18BTB	12	5	18	27	KLRUL18BTBE01		KLRUL18BTBE3R	
	KLRUL21BTB	15	5	21	30	KLRUL21BTBE01		KLRUL21BTBE3R	
	KLRUL25BTB	15	7.5	25	36	KLRUL25BTBE01		KLRUL25BTBE3R	
	KLRUL27BTB	20	7.5	27	43	KLRUL27BTBE01		KLRUL27BTBE3R	
	KLRUL35BTB	20 - 25	10	35	55	KLRUL35BTBE01		KLRUL35BTBE3R	
	KLRUL45BTB	30	15	45	59	KLRUL45BTBE01		KLRUL45BTBE3R	
	KLRUL55BTB	40	20	55	70	KLRUL55BTBE01		KLRUL55BTBE3R	
	KLRUL80BTB	50 - 60	25-30	80	105	KLRUL80BTBE01		KLRUL80BTBE3R	
	KLRUL110BPT	75	40	110	95	KLRUL110BPTE01		KLRUL110BPTE3R	
	KLRUL130BPT	100	50	130	117	KLRUL130BPTE01		KLRUL130BPTE3R	
	KLRUL160BPT	125	60	160	127	KLRUL160BPTE01		KLRUL160BPTE3R	
	KLRUL200BPT	150	75	200	135	KLRUL200BPTE01		KLRUL200BPTE3R	
	KLRUL250BPT	200	100	250	161	KLRUL250BPTE01		KLRUL250BPTE3R	
240 V - 3% Z	KLRUL300BPT	250	100	300	216	KLRUL300BPTE01		KLRUL300BPTE3R	
	KLRUL360BPT	300	125-150	360	221	KLRUL360BPTE01		KLRUL360BPTE3R	
	KLRUL420BPT	350	150	420	275	KLRUL420BPTE01		KLRUL420BPTE3R	
	KLRUL480BPT	400	200	480	267	KLRUL480BPTE01		KLRUL480BPTE3R	
	KLRUL600BPT	450	250	600	338	KLRUL600BPTE01		KLRUL600BPTE3R	
	KLRUL750BPT	500	300	750	372	KLRUL750BPTE01			
	KLRUL850BPT	750	350	850	389	KLRUL850BPTE01			
	KLRUL950BPT	800	390	950	479	KLRUL950BPTE01			

*For enclosed unit dimensions and added weight, please refer to the Reactor Enclosure Price page.





Options J1000 Drive

Remote Interface, RS232C. This option allows for RS232 communication to a Remote LED Digital Operator (JVOP-182).
Model No. SI-232/J

Remote Interface, RS232C. This option allows for RS232 communication to PC software such as DriveWizard Plus or USB Copy Unit (Y-Stick, JVOP-181).
Model No. SI-232/JC

Remote Interface, RS485/422. This option allows the drive to realize RS485/422 network communication with Modbus protocol.
Model No. SI-485/J

Analog Potentiometer Card. This option provides an analog potentiometer for frequency control, mounted to the front of the J1000 drive.
Model No. AI-V3/J

USB Copy Unit (Y-Stick). This option allows the drive to connect to the USB port on a PC. It can read, copy and verify drive parameter settings from one drive to another like drive. The unit plugs into the RS232C Remote Interface (SI-232/JC) option, sold separately.
Model No. JVOP-181

CopyUnitManager Software for USB Copy Unit (Y-Stick). This option allows the user to transfer and save parameter files from the Copy Unit (JVOP-181), sold separately, to a PC and vice versa.
No Model No.

UL Rated Remote Operator Kits. This option is used to extend the existing Digital Operator to the wall of a separately priced, oversized UL Type 1, 3R, 4, 4X, or 12 enclosure (IPX6 environment). Price includes a faceplate bezel with digital operator brackets and membrane to cover the operator cutout in the enclosure door, a 3-foot cable, a 10-foot cable, and a 1:1 template for cutting the necessary cutouts in the enclosure. Keypad can be removed after kit installation. Designed for use with the LED Operator (JVOP-182) sold separately.
Connects to RJ45 port and mounts to enclosure wall.

Model No. UUX000526 (Blank Membrane)

Model No. UUX000527 (Yaskawa Logo Membrane)

Operator, LED Digital Remote. This option allows the drive to be operated from a remote location. It requires the RS232C Remote Interface (SI-232/J), sold separately. This option also requires Installation Set A (EZZ020642A) for panel or door mounting and Remote Operator Cable (UWR0051 or UWR0052), each sold separately.

Model No. JVOP-182

Operator Cable, Remote. These cables are used to connect the Remote LED Digital Operator (JVOP-182). They are available in one (1) or three (3) meter lengths.

Model No. UWR0051 (1 meter)

Model No. UWR0052 (3 meter)

LED Keypad Installation Set A (Remote Operator Mounting Bracket Kit). This is a bracket to which the LED Digital Remote Operator (JVOP-182) attaches, and has (4) threaded holes and screws to attach to the cover of an enclosure. The kit contains (2) screws to mount the Operator to the bracket and (4) screws to attach the bracket to the enclosure.

Model No. EZZ020642A

LED Keypad Installation Set B (Remote Operator Mounting Bracket Kit). Contains a similar bracket that the keypad attaches to and has non-threaded holes for mounting to an enclosure that has the screws attached to the enclosure already. The kit contains (2) screws to mount the keypad to the bracket and (4) nuts to attach the bracket to the customer supplied screws attached to the enclosure.

Model No. EZZ020642B

DriveWizard Plus Software. This optional software package allows upload and download of parameters via PC for data storage and for programming multiple drives. The software also includes graphing and monitoring tools. It is a Windows-based program designed to make startup, commissioning, and troubleshooting of the J1000 as simple as possible. Refer to our website at www.yaskawa.com to download the software, and for more information, including minimum system requirements and cable information to interface a PC to V1000 or J1000 drives.

No Model No.

PC Interface Cable. This 6-foot cable interconnects the drive keypad port to the 9-pin communication port on a PC. It requires the RS232C Remote Interface (SI-232/JC), sold separately. This cable is used in conjunction with DriveWizard Plus software.

Model No. UWR00468-2

1/4" x 1 1/4" Time-Delay, Glass Tube Fuses MDL Series

Description

- Time-delay
- Optional axial leads available
- 1/4" x 1 1/4" (6.4 x 31.7mm) physical size
- Glass tube, nickel-plated brass endcap construction
- UL Listed product meets standard 248-14



Electrical Characteristics		
Rated Current	% of Amp Rating	Opening Time
1/16 - 30A	100%	None
	135%	60 minutes maximum
	200%	120 seconds maximum
1/16 - 3A	200%	5 seconds minimum
3-2/10 - 8A	200%	12 seconds minimum

Agency Information

- UL Listed Card: MDL 1/16 - 8A (Guide JDYX, File E19180)
- UL Recognized Card: MDL 9 - 30A (Guide JDYX2, File E19180)
- CSA Certification Card: MDL 1/16 - 8A (Class No. 1422-01)
- CSA Component Acceptance: MDL 9-30A (Class No. 1422-30)
- CE

Environmental Data

- Shock: 1A thru 30A – MIL-STD-202, Method 207, (HI Shock)
- Vibration: 1/4A thru 30A – MIL-STD-202, Method 204, Test Condition C (Except 5g, 500HZ)

Ordering

Specify packaging code

- Insert packaging code prefix before part number. E.g., BK (or BK1)-MDL-5-R

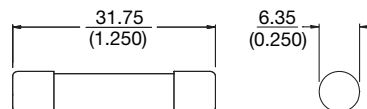
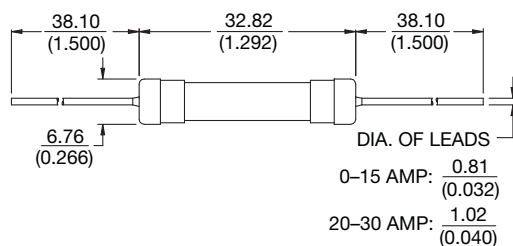
Specify option codes if desired

- For axial leads, insert "V" between catalog series and amp rating. E.g., BK-MDL-V-5-R

- For board washable, insert "B" between catalog series and amp rating. E.g., BK-MDL-B-5-R
- For axial leads and board washable, insert "B" then "V" between catalog series and amp rating. E.g., BK-MDL-BV-5-R

Dimensions - mm (in)

Drawing Not to Scale



Specifications

Part Number	Voltage Rating Vac	AC Interrupting Rating* (amps)@			Typical DC Cold Resistance** (Ω)	Typical Melting I ² t† AC	Typical Voltage Drop‡
		250Vac	125Vac	32Vac			
MDL-1/16-R	250	35	10000	-	45.6	0.0046	2.79
MDL-1/10-R	250	35	10000	-	15.68	0.0420	1.95
MDL-1/8-R	250	35	10000	-	12.238	0.0422	1.52
MDL-3/16-R	250	35	10000	-	4.81	0.116	1.05
MDL-2/10-R	250	35	10000	-	5.234	0.314	0.972
MDL-1/4-R	250	35	10000	-	3.208	0.447	0.965
MDL-3/10-R	250	35	10000	-	2.046	0.412	0.808
MDL-3/8-R	250	35	10000	-	1.567	0.982	1.46
MDL-1/2-R	250	35	10000	-	0.943	1.656	1.27
MDL-3/4-R	250	35	10000	-	0.397	4.343	1.01
MDL-1-R	250	35	10000	-	0.273	11.498	0.995
MDL-1-1/4-R	250	100	10000	-	0.205	86.2	0.722
MDL-1-1/2-R	250	100	10000	-	0.156	22.7	0.721
MDL-2-R	250	100	10000	-	0.116	62.3	0.644
MDL-2-1/4-R	250	100	10000	-	0.096	49.6	0.535
MDL-2-1/2-R	250	100	10000	-	0.081	63.1	0.410
MDL-3-R	250	100	10000	-	0.057	67.5	0.345
MDL-4-R	250	200	10000	-	0.038	19.3	0.187
MDL-5-R	250	200	10000	-	0.025	32.0	0.160
MDL-6-R	250	200	10000	-	0.022	37.4	0.155
MDL-6-1/4-R	250	200	10000	-	0.02	38.7	0.152
MDL-7-R	250	200	10000	-	0.018	42.7	0.140
MDL-8-R	250	200	10000	-	0.015	47.8	0.119
MDL-9-R	32	-	-	1000	0.012	51.5	0.124
MDL-10-R	32	-	-	1000	0.01	64.4	0.114
MDL-15-R	32	-	-	1000	0.005	354.0	0.130
MDL-20-R	32	-	-	1000	0.004	2914.0	0.530
MDL-25††	32	-	-	1000	0.01225	15221.0	0.30
MDL-30††	32	-	-	1000	0.0011	15581.0	0.40

* Interrupting Ratings (Interrupting ratings were measured at 70% - 80% power factor on AC)

** DC Cold Resistance (Measured at ≤10% of rated current)

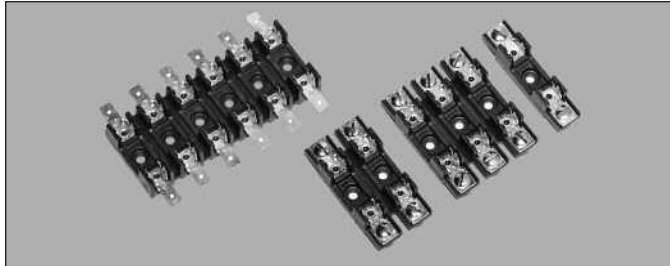
† Typical Melting I²t (A²Sec) (I²t was measured at listed interrupting rating and rated voltage.)

‡ Typical Voltage Drop (Voltage drop was measured at 25°C±3°C ambient temperature at rated current)

†† MDL-25 & MDL-30 not available in RoHS compliant construction.

S-8000 Series

1/4" x 1 1/4" Fuse Blocks



Description

- For 1/4" x 1 1/4" (6.3 x 32mm) fuses
- Bolt-in and snap-in mounting available
- Tight cluster mounting
- All types of terminal configurations
- Clips made of spring-bronze
- Anti-rotational pin provided
- Flame retardant thermoplastic meets UL 94V0

Environmental Data

- Relative Temperature Index (RTI)
 - Bolt-in 130°C
 - Snap-in 110°C

Agency Information

- UL Recognized: E14853
- CSA Certified: 47235

RoHS
2002/95/EC

Specifications

Series	Volts	UL Max Amps	CSA Max. Amps
S-8000	300Vac/dc	25	21
S-8100	300Vac/dc	20	13
S-8200	300Vac/dc	20	16
S-8300	300Vac/dc	30	25

Dimensions - mm/in.

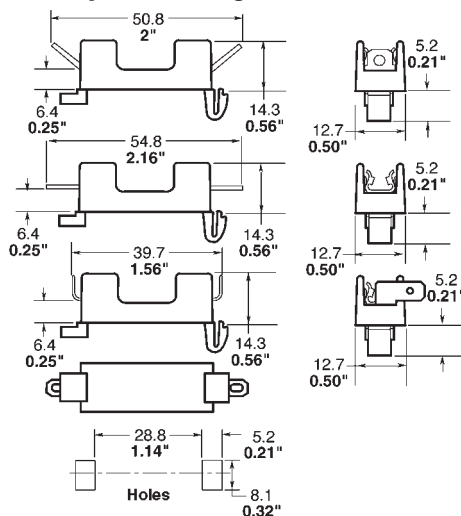
S-8000 Single-Pole Snap-In Mounting Series

40° Terminal

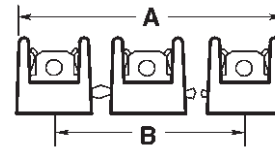
0°
Terminal

Side
Terminal

Mounting



Multiple Pole



Mounting Dimensions

No. of Poles	Inches		Millimeters	
	A	B	A	B
1	—	—	—	—
2	1 1/8"	5/8"	28.6	15.9
3	1 3/4"	1 1/4"	44.4	31.8
4	2 3/8"	1 7/8"	60.3	47.6
5	3"	2 1/2"	76.2	63.5
6	3 5/8"	3 1/8"	92.1	79.4
7	4 1/4"	3 3/4"	108.0	95.2
8	4 7/8"	4 3/8"	123.8	111.1
9	5 1/2"	5"	139.7	127.0
10	6 1/8"	5 5/8"	155.6	142.9
11	6 3/4"	6 1/4"	171.4	158.8
12	7 3/8"	6 7/8"	187.3	174.6

Dimensions - mm/in.

S-8000 Single-Pole Bolt-In Mounting Series

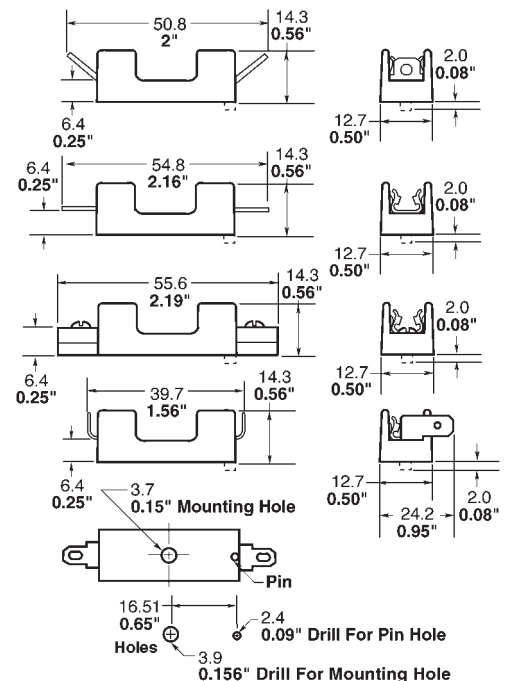
40° Terminal

0°
Terminal

Screw
Terminal

Side
Terminal

Mounting



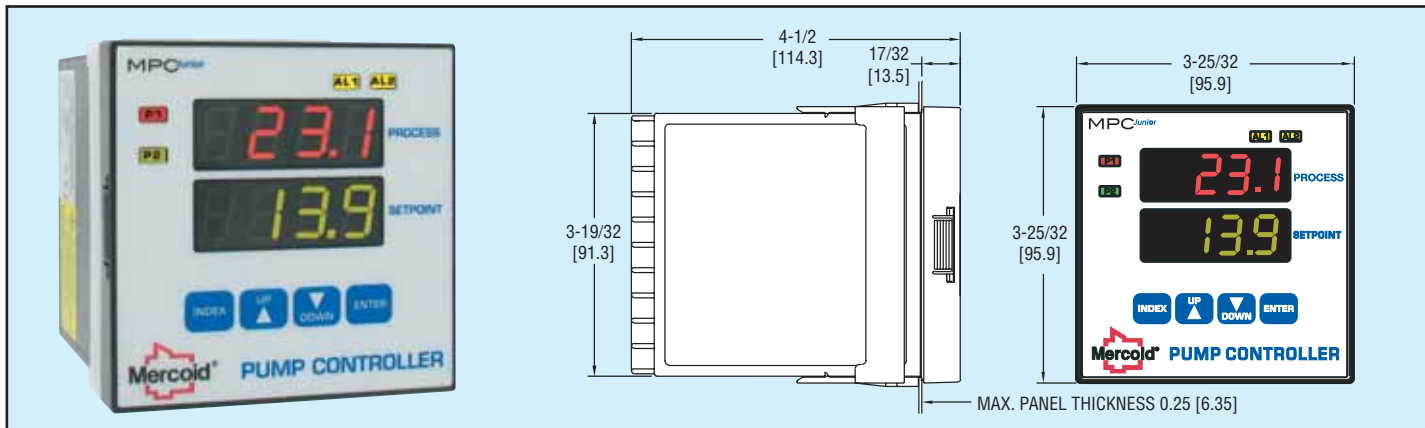
Component	Material
Clip	Spring-Bronze, Bright Tin-Plate
Body	Thermoplastic



Series
MPC Jr.

Pump Controller

One or Two Pump Control with Built-In Alternation



The **Mercoïd MPC Junior Pump Controller** provides versatile level control in a standard 1/4 DIN package. Designed for use with almost any style level transmitter the unit displays the present level and main set point value. Incorporated in the MPC Jr. is programmable level differential for on/off control of one or two pumps, valves, or other devices through two SPDT relays. Also featured are two additional programmable alarm contacts with front alarm light indication.

The MPC Jr. is flexible and incorporates a user-friendly programming menu. The front face meets NEMA 4X for outdoor panel mounting.

FEATURES

- Selectable pump alternation when used with two pumps to minimize pump wear.
- Integral 24 VDC power supply for transmitter.
- User selectable security lock-out of programming and/or set points.
- Optional process input retransmission as a current (4 to 20 mA) or voltage (2 to 10 VDC) analog signal.
- Analog output of pump "on" condition for activation of separate pump run time meters.

SPECIFICATIONS

Inputs: 4 (or 0) to 20 mA DC or 2 (or 0) to 10 VDC selectable.

Input Impedance: Current = 10 ohms, Voltage = 5 K ohms.

Output Ratings:

Control Relays: SPDT, rated 10A @ 240 VAC res., 1/4 hp @ 120 VAC, 1/3 hp @ 240 VAC.

Alarm Relays: SPST, 3A @ 240 VAC res., 1/10 hp @ 120 VAC.

Others: 15 VDC @ 20 mA for output one and output two.

Control Type: On/off, reverse (pump out) or direct (pump in) acting.

Power Requirements: 100 to 240 VAC nominal, +10%-15%, 50 to 400 Hz, single phase; 132 to 240 VDC nominal, +10%-15%.

Power Consumption: 7.5 VA maximum.

Accuracy: $\pm 0.25\%$ of span, ± 1 least significant digit.

Display: Two 4-digit, 7 segment 0.56" high LED's.

Display Resolution: 1 count.

Memory Backup: Nonvolatile memory (no batteries required).

Serial Communications: Optional RS-232 or RS-485 with Modbus[®] protocol.

Ambient Operating Temperature/RH: 14 to 131°F (-10 to 55°C)/0 to 90% up to 104°F (40°C) non-condensing, 10 to 50% at 131°F (55°C) non-condensing.

Weight: 16 oz (454 g).

Front Panel Rating: Meets UL Type 4X (IP66).

Loop Power Supply (isolated): 24 VDC @ 50 mA, regulated.

Agency Approvals: UL 508, CE.

Series MPCJR Pump Controller

OPTIONS

Retransmission of input, 4 to 20 mA,
Add suffix – **RC**

Retransmission of input, 0 to 10 VDC,
Add suffix – **RV**

RS-232 Modbus[®]-RTU Serial Communications
Add suffix – **232**

RS-485 Modbus[®]-RTU Serial Communications
Add suffix – **485**

Modbus[®] is a registered trademark of Schneider Automation.

ACCESSORIES

Weatherproof Enclosures, NEMA 4X.

See page 307 for details.

For compatible level transmitters see
Mercoïd Series SBLT and PBLT.



A-901



BLUE RIBBON CORP.

2770 Long Road, Grand Island, NY 14072 USA

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SUBMERSIBLE / LEVEL TRANSMITTER MODEL BC001 - BIRDCAGE® SERIES

LIFE-TIME SURGE WARRANTY REPLACEMENT PROGRAM

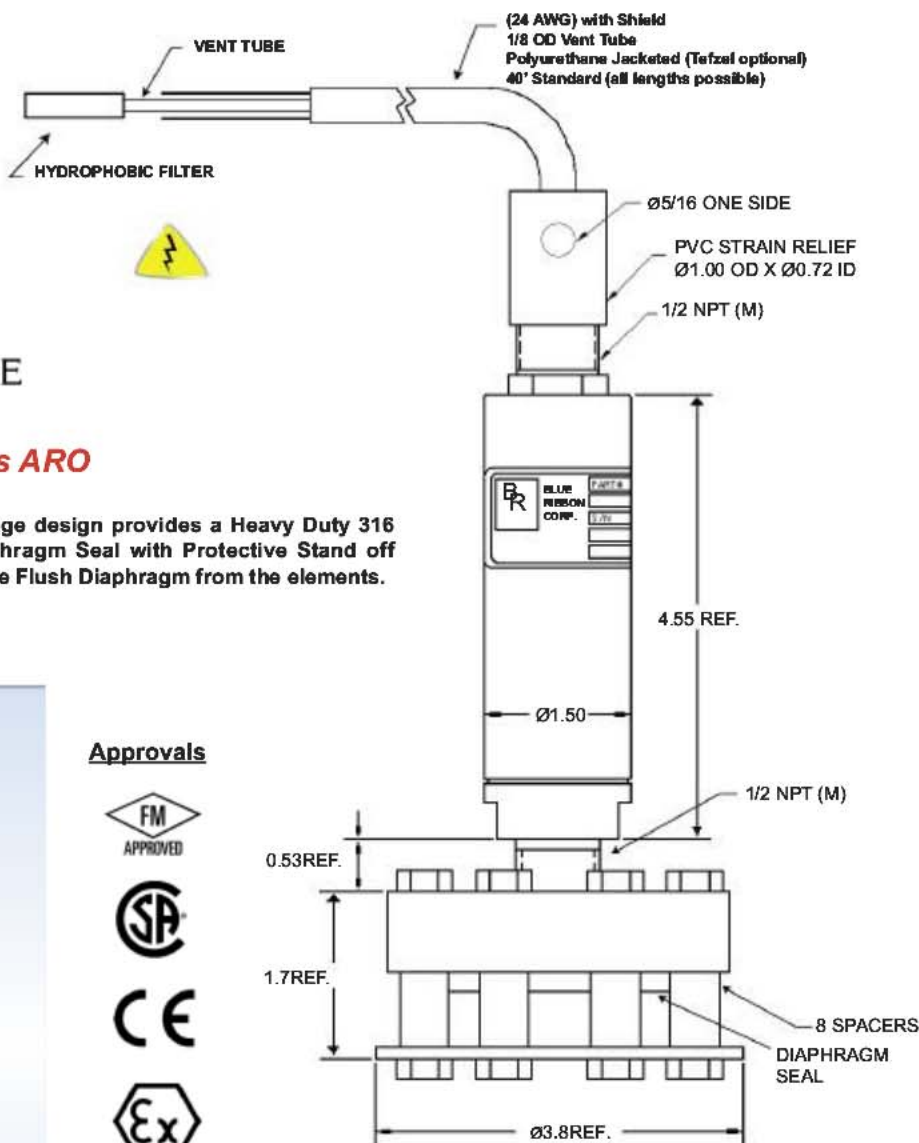
(Consult factory for details)



BIRDCAGE

Ships 1-3 days ARO

The Patented Birdcage design provides a Heavy Duty 316 Stainless Steel Diaphragm Seal with Protective Stand off plate that protects the Flush Diaphragm from the elements.



APPLICATIONS:

- Lift / Pump Station Sewage Level
- Sludge Level
- Oil and Gas Industry

FEATURES:

- Life-Time Surge Warranty Replacement Program when partnered with the **BCP3000 Surge Protector**
- Enhanced Internal Surge & Lightning Protection
- 2.5" Sensing Diaphragm with Dual Internal Diaphragm
- Corrosion Resistant, 316 SS Rugged, Welded Construction
- 4-20 mA, (0-5 VDC optional upon request)
- Glycerine-filled, other fluids available
- ** FM, CSA, CE, and/or ATEX/IEC
- ** Approval Available Upon Request
- Optional 4-20 mA Temperature Output

Approvals



Blue Ribbon reserves the right to make product improvements and amendments to the product specifications stated throughout this brochure without prior notification. Please contact the factory on all critical dimensions and specifications for verification.



BLUE RIBBON CORP.

2770 Long Road, Grand Island, NY 14072 USA
Tel. (716) 773-9300 • Fax (716) 773-5019
brsales@blueribboncorp.com • www.blueribboncorp.com

Standard Specifications listed below. Consult factory for further options, which may change the overall dimensions.

Output (at 70°F)	Model BC001 4-20mA 9.0 – 36 VDC Excitation 0-5 VDC 9.0 – 40 VDC Excitation - Optional		
Accuracy	Static Accuracy 0.5% FSO BFSL (0.2% optional)	1 Year Stability 0.20% FSO	Error Band (with temp.) 1.0% BFSL FSO
Pressure Ranges	0-5 PSI to 0-100 PSI		
Zero Balance (at 70°F)	± 1% FSO		
Range Calibration Signal	Internal Calibration Resistor set to 100 ±0.5% FSO unless otherwise specified		
Insulation Resistance	>10 megohms @ 50 VDC & @ 70°F		
Temperature Limits	Compensated +35°F to +125°F	Operating 0°F to +140°F	Storage -40°F to +250°F
Temperature Compensation (Standard)	Zero / Span Less than ±2% FSO/100°F at FSPR and/or URL		
Electricals	Load Impedance 1350 ohms maximum at 36 VDC and 750 ohms maximum at 24 VDC RFI Protection Voltage Surge Suppression Lightning Protection		
Electrical Connection	Polyurethane or Tefzel Reinforced Cable with Integral vent tube and Hydrophobic filter (40 Ft. Standard – other lengths available upon request)		
Mechanicals	Proof Pressure 3X FSPR (or URL)	Burst Pressure 5X FSPR (or URL)	
Pressure Response	≤ 5 ms to 90%		
Weight	5.5 lbs.		
Wetted Material	Case 316 Stainless Steel 2.75" diameter Sensing Diaphragm - 316 SS	Cable Polyurethane or Tefzel Reinforced Cable with Integral vent tube and Hydrophobic filter (40 Ft. Standard – other lengths available upon request)	
Accessories	BCP3000 Surge Protector LIFE-TIME SURGE WARRANTY PROGRAM FOR BC001 BCP3005 Pluggable Surge Replacement BCH2000 Cable Hanger		

ORDERING GUIDE FOR MODEL 01:

PART #	PRESSURE RANGE	CABLE LENGTH
•	•	•/•/•

PART #: 01

PRESSURE RANGE:

ORDER CODE	PSI or	FT. WC
001	5	11.53
002	10	23.07
004	15	34.60
017.5	17.5	40.37
020	20	46.14
025	25	57.67
030	30	69.21
100	100	230.70

WIRING CODE

WIRE COLOR	BC001
RED	+ EXC./SIGNAL
BLACK	- EXC./SIGNAL
SHIELD	OPEN

CABLE LENGTH:

AA	40' Polyurethane Cable (Standard)
AA-CZ	Alternate Length of Cable (in feet optional)
AA/CT	40' Tefzel Cable
AA/VDC	0-5 VDC
AA/FM	Intrinsically Safe - FM
(Custom lengths of cable available upon request)	

EXAMPLE: 01001AA

5 PSI with 40' CABLE

01002AA

RJ Series Slim Power Relays

Compact and rugged power relays. Large switching capacity.

- Compact housing only 12.7-mm wide.
Large contact rating
RJ1 (1-pole): 16A (UL general use rating @250V AC)
RJ2 (2-pole): 8A
- Non-polarized LED indicator available on blade type. IDEC's unique light guide structure enables high visibility of coil status from any direction.
- Excellent electrical and mechanical life.
Electrical life: 200,000 operations (AC load)
Mechanical life: 30 million operations (AC coil)
- RoHS directive compliant (EU directive 2002/95/EC). Contains no lead, cadmium, mercury, hexavalent chromium, PBB or PBDE).
- Diode model:
Diode reverse withstand voltage: 1000V
- UL recognized, CSA certified, EN compliant.



UL508
UL File No. E55996



CSA C22.2 No. 14
1608322
CSA File No. LR35144



EN61810-1
VDE (REG.-Nr B312)



EN61810-1
EC Low Voltage Directive

Part Number Selection

	Terminal	Contact	Model	Part Number	Coil Voltage Code (Standard Stock in bold)
	Blade	SPDT	Standard	RJ1S-C-	A24 , A110, A120 , A220, A240 , D12, D24 , D48, D100
			with LED	RJ1S-CL-	
			with Surge Suppresion Diode	RJ1S-CD-	D12, D24 , D48, D100
			with LED & Surge Suppresion Diode	RJ1S-CLD-	
		DPDT	Standard	RJ2S-C-	A24 , A110, A120 , A220, A240 , D12, D24 , D48, D100
			with LED	RJ2S-CL-	
			with Surge Suppresion Diode	RJ2S-CD-	D12, D24 , D48, D100
			with LED & Surge Suppresion Diode	RJ2S-CLD-	
	PCB	SPDT	Standard	RJ1V-C-	A24 , A110, A120 , A220, A240 , D5, D6, D12, D24 , D48, D100
			High Capacity	RJ1V-CH-	
		SPST-NO	Standard	RJ1V-A-	
			High Capacity	RJ1V-AH-	
		DPDT	Standard	RJ2V-C-	
		DPST-NO	Standard	RJ2V-A-	

Ordering Information

When ordering, specify the Part No. and coil voltage code:

(example) **RJ1S-C-** **A120**
Part No. Coil Voltage Code

Coil Voltage Table

Coil Voltage Code	A12	A24	A110	A120	A220	A240	D5	D6	D12	D24	D48	D100
Coil Rating	12V AC	24V AC	110V AC	120V AC	220V AC	240V AC	5V DC	6V DC	12V DC	24V DC	48V DC	100-110V DCV DC

R1/R2/SR

Sockets

	Relays	Standard DIN Rail Mount	Finger-safe DIN Rail Mount	PCB Mount
Blade Models	RJ1S (Std)	SJ1S-05B	SJ1S-07L	SJ1S-61
	RJ2S (Std)	SJ2S-05B	SJ2S-07L	SJ2S-61
PCB Models	RJ1V (Std)	—	SQ1V-07B*	SQ1V-63*
	RJ1V (HC) RJ2V	—	SQ2V-07B*	SQ2V-63*



*Hold-down clip or spring must be removed to use with RJ PCB relays.

Replacement Hold Down Springs

Part Number	Used With Socket
SJ9Z-C1	SJ1S-05B, SJ1S-07L, SJ2S-05B, SJ2S-07L
SQ9Z-C	SQ1V-07B, SQ2V-07B
SQ9Z-C63	SQ1V-63, SQ2V-63

Jumpers for SJ Sockets

Poles	Part Number	Quantity
2	SJ9Z-JF2	Must purchase in quantities of 10.
5	SJ9Z-JF5	
8	SJ9Z-JF8	
10	SJ9Z-JF10	

Accessories

Description	Appearance	Use with	Part No.	Remarks
Aluminum DIN Rail (1 meter length)		All DIN rail sockets	BNDN1000	IDEC offers a low-profile DIN rail (BNDN1000). The BNDN1000 is designed to accommodate DIN mount sockets. Made of durable extruded aluminum, the BNDN1000 measures 0.413 (10.5mm) in height and 1.37 (35mm) in width (DIN standard). Standard length is 39" (1,000mm).
DIN Rail End Stop		DIN rail	BNL5	9.1 mm wide.

Specifications

Model		RJ1	RJ2
Number of Poles		1-pole	2-pole
Contact Configuration		SPDT	DPDT
Contact Material		Silver-nickel alloy	
Degree of Protection		IP40	
Contact Resistance (initial value) (*1)		50 mΩ maximum	
Operate Time (*2)		15 ms maximum	
Release Time (*2)		10 ms maximum (with diode: 20 ms maximum)	
Dielectric Strength	Between contact and coil	5000V AC, 1 minute	5000V AC, 1 minute
	Between contacts of the same pole	1000V AC, 1 minute	1000V AC, 1 minute
	Between contacts of different poles	—	3000V AC, 1 minute
Vibration Resistance	Operating extremes	10 to 55 Hz, amplitude 0.75 mm	
	Damage limits	10 to 55 Hz, amplitude 0.75 mm	
Shock Resistance	Operating extremes	NO contact: 200 m/s ² , NC contact: 100 m/s ²	
	Damage limits	1000 m/s ²	
Electrical Life (rated load)		AC load: 200,000 operations minimum (operation frequency 1800 operations per hour) DC load: 100,000 operations minimum (operation frequency 1800 operations per hour)	
Mechanical Life (no load)		AC coil: 30,000,000 operations minimum (operation frequency 18,000 operations per hour) DC coil: 50,000,000 operations minimum (operation frequency 18,000 operations per hour)	
Operating Temperature (*3)		-40 to +70°C (no freezing)	
Operating Humidity		5 to 85% RH (no condensation)	
Weight (approx.)		19g (blade type), 17g (PCB form C type), 16g (PCB form A type)	



Note: Above values are initial values.

1. Measured using 5V DC, 1A voltage drop method.
2. Measured at the rated voltage (at 20°C), excluding contact bounce time.
3. 100% rated voltage.

RU Series Universal Relays

Full featured universal miniature relays

Designed with environment taken into consideration

- Two terminal styles: plug-in and PCB mount
- Non-polarized LED indicator available on plug-in relays
- No internal wires, lead-free construction
- Cadmium-free contacts
- Mechanical flag indicator available on plug-in relays
- Manual latching lever with color coding for AC or DC coil
- Snap-on yellow marking plate; optional marking plates are available in four other colors
- Maximum contact ratings: 10A (RU2), 6A (RU4), 3A (RU42)
- UL Recognized, CSA Certified, EN Compliant



UL508
CSA C22.2 No. 14
File No. E66043



CSA C22.2 No. 14
CSA File No. LR35144



EN61810-1

With Latching or Momentary Lever

Mechanical Indicator*

The contact position can be confirmed through the five small windows.

Marking Plate

Standard yellow marking plate is easily replaced with optional marking plates in four colors for easy identification of relays.

LED Indicator*

Non-polarized green LED indicator is standard provision for plug-in terminal, latching lever types



Latching and Momentary Lever

Using the lever, operation can be checked without energizing the coil. The lever is color coded for AC and DC coils.

	Latching	Momentary
AC coil:	Orange	Red
DC coil:	Green	Blue

In Normal Operation



Note: Turn off the power to the relay coil when using the latching lever. After checking the operation, return the latching lever in the normal position.

Standard (without lever)

AC/DC Color Marking

For identification of AC or DC coils.

AC coil: Yellow
DC coil: Blue

Mechanical Indicator*

Marking Plate

LED Indicator*

Non-polarized green LED indicator is standard provision for plug-in terminal types.



AC Coil



DC Coil



Coil Voltage	Tape Color
24V AC	White
100 to 110V AC	Clear
110 to 120V AC	Blue
200 to 220V AC	Black
220 to 240V AC	Red
24V DC	Green
6V DC	Voltage marking on yellow tape
12V DC	
48V DC	
110V DC	



*Not available on PCB type.

Part Number Selection

Contact	Model	Part Number			Coil Voltage Code (Standard Stock in bold)
		Standard	With Latching Lever	With Momentary Lever	
DPDT (10A) 	Standard	RU2S-C-	RU2S-	RU2S-M-	A24, A110 , A220 D6, D12, D24 , D48, D110
	With RC (AC coil only)	RU2S-CR-	RU2S-R-	RU2S-MR-	A110, A220
	With diode (DC coil only)	RU2S-CD-	RU2S-D-	RU2S-MD-	D6, D12, D24 , D48, D110
	PCB	RU2V-NF-	—	—	A24, A110, A220 D6, D12, D24 , D48, D110
4PDT (6A) 	Standard	RU4S-C-	RU4S-	RU4S-M-	A24, A110 , A220 D6, D12, D24 , D48, D110
	With RC (AC coil only)	RU4S-CR-	RU4S-R-	RU4S-MR-	A110, A220
	With diode (DC coil only)	RU4S-CD-	RU4S-D-	RU4S-MD-	D6, D12, D24, D48, D110
	PCB	RU4V-NF-	—	—	A24, A110 , A220 D6, D12, D24 , D48, D110
4PDT Bifurcated (3A) 	Standard	RU42S-C-	RU42S-	RU42S-M-	A24, A110, A220 D6, D12, D24 , D48, D110
	With RC (AC coil only)	RU42S-CR-	RU42S-R-	RU42S-MR-	A110, A220
	With diode (DC coil only)	RU42S-CD-	RU42S-D-	RU42S-MD-	D6, D12, D24, D48, D110
	PCB	RU42V-NF-	—	—	A24, A110, A220 D6, D12, D24 , D48, D110



1. Plug-in terminal models have an LED indicator and a mechanical indicator as standard.
2. PCB models do not have an LED indicator or a mechanical indicator.

Ordering Information

When ordering, specify the Part No. and coil voltage code:

(example) **RU2S-C** **A110**
 Part No. Coil Voltage Code

Coil Voltage Table

Coil Voltage Code	A24	A110	A220	D6	D12	D24	D48	D110
Coil Rating	24V AC	110-120V AC	220-240V AC	6V DC	12V DC	24V DC	48V DC	110V DC

Sockets

Relays	Spring Clamp DIN Rail Mount	Standard DIN Rail Mount	Finger-safe DIN Rail Mount	Panel Mount	PCB Mount
RU2S (DPDT)	SU2S-11L	SM2S-05	SM2S-05C	SY4S-51	SM2S-61 SM2S-62
RU4S (4PDT) RU42S (4PDT)	SU4S-11L	SY4S-05	SY4S-05C		SY4S-61 SY4S-62
					

**R3/R3A/R4/R5/R6/R7/R8/R9/R10/
R11**

GE1A Series — ON Delay Timers

Single Function

Key features of the GE1A series include:

- DPDT or SPDT + instantaneous SPDT
- 8-pin, octal base
- 8 time ranges
- Repeat error $\pm 0.2\%$ maximum
- Large, clear knob for easy setting
- Instant monitoring of operational status by LED indicators



UL, c-UL Listed
File No. E55996



Specifications

Rated Operating Voltage		24V AC/DC 100 to 120V AC 220 to 240V AC
Voltage Tolerance		AC: 85 to 110% DC: 90 to 110%
Contact Rating		240V AC/5A 24V DC/5A
Contact Form		DPDT or SPDT+ instantaneous SPDT
Repeat Error		±0.2% ±10msec maximum
Voltage Error		±0.5% ±10msec maximum
Temperature Error		±3% maximum
Setting Error		±10% maximum
Reset Time		0.1 sec maximum
Insulation Resistance		100MΩ minimum (500V DC megger)
Dielectric Strength		Between power and output terminals: 1,500V AC, 1 minute Between contact circuits: 750V AC, 1 minute
Vibration Resistance		Damage limits: Amplitude 0.75mm, 10 to 55 Hz Operating extremes: Amplitude 0.5mm, 10 to 55 Hz
Shock Resistance		Damage limits: 500m/s² (Approx. 50G)
Power Consumption	GE1A-B	24V AC type: 1.6 VA
		24V DC type: 1.0W
		110V AC type: 3.8 VA
		220V AC type: 7.7 VA
	GE1A-C	24V AC type: 2.0 VA
		24V DC type: 0.8W
		110V AC type: 3.5 VA
		220V AC type: 8.0 VA
Electrical Life		100,000 operations minimum (at full rated load)
Mechanical Life		10,000,000 operations minimum
Operating Temperature		−10 to +55°C (without freezing)
Operating Humidity		35 to 85% RH (without freezing)

Part Numbering List

Mode of Operation	Contact	Output	Rated Voltage	Time Range	Complete Part Number
ON-Delay	Delayed SPDT + Instantaneous SPDT	24V DC/120V AC, 5A 240V AC, 5A	24V AC/DC	0.1s to 10m	GE1A-B10MAD24
			110-120V AC		GE1A-B10MA110
			220-240V AC		GE1A-B10MA220
			24V AC/DC	0.1m to 10h	GE1A-B10HAD24
			110-120V AC		GE1A-B10HA110
			220-240V AC		GE1A-B10HA220
	Delayed DPDT		24V AC/DC	0.1s to 10m	GE1A-C10MAD24
			110-120V AC		GE1A-C10MA110
			220-240V AC		GE1A-C10MA220
			24V AC/DC	0.1m to 10h	GE1A-C10HAD24
			110-120V AC		GE1A-C10HA110
			220-240V AC		GE1A-C10HA220

Switches & Pilot Lights

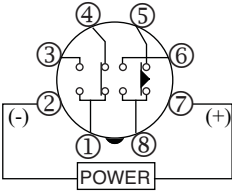
Display Lights

Timing Diagrams/Schematics

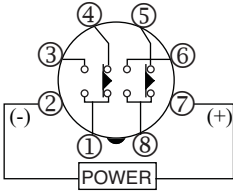
TD1/TD2

Operation
Mode Selection

GE1A-B
Delayed SPDT + Instantaneous SPDT



GE1A-C
Delayed DPDT



Relays & Sockets

ON-Delay 1

MODE

A



Item	Terminal Number	Operation
Set Time		
Power	2 - 7 (8p)	
Delayed Contact	5 - 8 (8p) (NC)	
	6 - 8 (8p) (NO)	
Instantaneous Contact	1 - 4 (NC)	
	1 - 3 (NO)	
Indicator	POWER	
	OUT	

Item	Terminal Number	Operation
Set Time		
Power	2 - 7 (8p)	
Delayed Contact	5 - 8 (8p) (NC)	
	6 - 8 (8p) (NO)	
Indicator	POWER	
	OUT	

Timers

Terminal Blocks

Circuit Breakers

RY/RM Series — General Purpose Miniature Relays

Key features of the RY series include:

- Compact miniature size saves space
- 2PDT and 4PDT models, available with bifurcated crossbar contacts, ensure reliable low-current switching for dry circuit applications
- Choice of plug-in/solder or PCB type terminals
- Options include check button for test operation and indicator lights
- DIN rail, surface, panel, and PCB type sockets available for a wide range of mounting applications



Specifications	Contact Material	RY2, RY4: Silver (Ag), gold-plated RY22, RY42: Ag-Pd alloy RM: Silver (Ag)
	Contact Resistance	RY2, RY4: 50mΩ maximum RY22, RY42: 100mΩ maximum RM: 30mΩ maximum
	Minimum Applicable Load	RY2, RY4: 5V DC, 10mA/24V DC, 5mA RM2: 24VDC/10mA, 5VDC/20mA (reference value) Bifurcated contacts: RY22, RY42: 1V DC, 100μA (reference value)
	Operating Time	20ms maximum
	Release Time	20ms maximum
	Maximum Continuous Applied Voltage (AC/DC) at 20°C	110% of the rated voltage
	Minimum Operating Voltage (AC/DC) at 20°C	80% of the rated voltage
	Drop-Out Voltage (AC)	30% or more of the rated voltage
	Drop-Out Voltage (DC)	10% or more of the rated voltage
	Power Consumption	RY2, RY22: DC: approximately 0.8W AC: approximately 1.1VA (50Hz), 1VA (60Hz) RY4, RY42, RM2: DC: approximately 0.9W AC: approximately 1.4VA (50Hz), 1.2VA (60Hz)
	Insulation Resistance	100MΩ minimum (measured with 500V DC megger)
	Dielectric Strength	RY2, RY22: Between live and dead parts: 1,500V AC, 1 minute; Between contact and coil: 1,500V AC, 1 minute; Between contacts of different poles: 1,500V AC, 1 minute; Between contacts of the same pole: 1,000V AC, 1 minute RY4, RY42, RM2: Between live and dead parts: 2,000V AC, 1 minute; Between contact and coil: 2,000V AC, 1 minute; Between contacts of different poles: 2,000V AC, 1 minute; Between contacts of the same pole: 1,000V AC, 1 minute
	Frequency Response	1,800 operations/hour
	Temperature Rise	Coil: 85°C maximum Contact: 65°C maximum
	Vibration Resistance	0 to 6G (55Hz maximum)
	Shock Resistance	RY2, RY22: 100N (approximately 10G) RY4, RY42, RM2: 200N (approximately 20G)
	Life Expectancy	RY2, RY4: over 200,000 operations (120V, 3A) RY22, RY42: over 200,000 operations (120V AC, 1A) RM2: over 500,00 operations (240V AC, 5A)
		Mechanical over 50,000,000 operations
	Operating Temperature	–30 to +70°C
	Weight	DPDT: 23g; 4PDT: 34g (approximately)


 UL Recognized
Files No. E55996

 CSA Certified
File No. LR35144


File No. B020813332452


Ordering Information

Order standard voltages for fastest delivery. Allow extra delivery time for non-standard voltages.

Basic Part No.

RY4S-U

Coil Voltage:

AC110-120V

Part Numbers

Part Numbers: RY/RM Series with Options

Termination	Contact Configuration	Basic Part No.	Indicator Light	Check Button	Indicator Light and Check Button	Top Bracket
S Solder/plug-in	DPDT small footprint	RY2S-U	RY2S-UL	RY2S-UC	RY2S-ULC	RY2S-UT
	DPDT (bifurcated contacts)	RY22S-U	RY22S-UL	RY22S-UC	RY22S-ULC	RY22S-UT
	DPDT wide footprint	RM2S-U	RM2S-UL	RM2S-UC	RM2S-ULC	RM2S-UT
	4PDT	RY4S-U	RY4S-UL	RY4S-UC	RY4S-ULC	RY4S-UT
	4PDT (bifurcated contacts)	RY42S-U	RY42S-UL	RY42S-UC	RY42S-ULC	RY42S-UT
V PCB 0.031" (0.8mm) wide	DPDT small footprint	RY2V-U	RY2V-UL	RY2V-UC	RY2V-ULC	—
	DPDT (bifurcated contacts)	RY22V-U	RY22V-UL	RY22V-UC	RY22V-ULC	—
	DPDT wide footprint	RM2V-U	RM2V-UL	RM2V-UC	RM2V-ULC	—
	4PDT	RY4V-U	RY4V-UL	RY4V-UC	RY4V-ULC	—
	4PDT (bifurcated contacts)	RY42V-U	RY42V-UL	RY42V-UC	RY42V-ULC	—

R12

Ratings

Coil Ratings

Rated Voltage (V)		Rated Current ±15% at 20°C				Coil Resistance ±10% at 20°C		Coil Inrush (60Hz)		Coil Inductance			
		60Hz		50Hz						Energizing		De-Energizing	
AC		RY2, RY22	RM2, RY4, RY42	RY2, RY22	RM2, RY4, RY42	RY2, RY22	RM2, RY4, RY42	RY2, RY22	RM2, RY4, RY42	RY2, RY22	RM2, RY4, RY42	RY2, RY22	RM2, RY4, RY42
	6V	150mA	200mA	170mA	240mA	18.8Ω	9.4Ω	250mA	340mA	0.09H	0.08H	0.06H	0.04H
	12V	75mA	100mA	86mA	121mA	76.8Ω	39.3Ω	120mA	170mA	0.37H	0.30H	0.22H	0.16H
	24V	37mA	50mA	42mA	60.5mA	300Ω	153Ω	56mA	85mA	1.5H	1.2H	.9H	0.63H
	120V*	7.5mA	11mA	8.6mA	13.1mA	7,680Ω	4,170Ω	12mA	16mA	37H	33H	22H	15H
	240V †	3.2mA	5.5mA	3.7mA	6.6mA	31,200Ω	15,210Ω	7mA	8mA	130H	130H	77H	62H
DC		RY2, RY22		RM2, RY4, RY42		RY2, RY22	RM2, RY4, RY42	N/A					
	6V	128mA		150mA		47Ω	40Ω						
	12V	64mA		75mA		188Ω	160Ω						
	24V	32mA		36.9mA		750Ω	650Ω						
	48V	18mA		18.5mA		2,660Ω	2,600Ω						
	110V‡	—		9.1mA		—	12,100Ω						

* For RY4/RY42/RM2 relays = AC110/120V AC.

† For RY4/RY42/RM2 relays = 220/240V AC.

‡ For RY4/RY42/RM2 relays = 100/110V DC.

Contact Ratings (gold plated) RY4, RY2

Voltage	Contact	Resistive		Inductive	
		UL	CSA	UL	CSA
30V DC	DPDT	3A	3A	3A	1.5A
	4PDT	5A	5A	5A	1.5A
100V DC	DPDT	0.2A	—	0.2A	0.2A
	4PDT	0.2A	—	0.2A	0.2A
120V AC	DPDT	3A	3A	1.5A	1.5A
	4PDT	5A	5A	5A	5A
240V AC	DPDT	3A	3A	0.8A	0.8A
	4PDT	5A	5A	5A	5A

Contact Ratings (bifurcated) RY42, RY22

Voltage	Resistive UL/CSA	Inductive UL/CSA
30V DC	1A	0.5A
120V AC	1A	0.5A
240V AC	0.8A	0.4A

Contact Ratings RM2

Voltage	Resistive			Inductive		
	Nominal	UL	CSA	Nominal	UL	CSA
30V DC	5A	5A	5A	2.5A	—	2.5A
110V DC	0.4A	0.4A	—	0.4A	—	0.4A
120V AC	5A	5A	5A	2.5A	2.5A	2.5A
240V AC	5A	5A	5A	2A	2A	2A

Applicable Sockets

RY4Part Numbers: Sockets

Relay	Standard DIN Rail Mount	Finger-Safe DIN Rail Mount	Panel Mount	PC Mount
RY2S RY22S	SY2S-05	SY2S-05C	SY2S-51	SY2S-61
RM2	SM2S-05	SM2S-05C	SM2S-51	SY4S-61 SY4S-62
RY4S RY42S	SY4S-05	SY4S-05C	SY4S-51	



See Section F for details on sockets. All DIN rail mount sockets shown above can be mounted using DIN rail BNDN1000.

Spring (optional)	
Part Number	Use With
SY2S-02F1③ SFA-101① SFA-202②	SY2S-05, -05C
SFA-301① SFA-302② SY4S-51F1③	SY2S-51, -61
SY4S-02F1③ SFA-101① SFA-202②	SY2S-05, -05C
SFA-301① SFA-302② SY4S-51F1③	SY4S-51, -61



- ① Top latch
- ② Side latch
- ③ Pullover spring

Internal Circuits

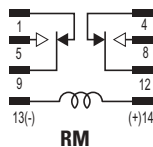
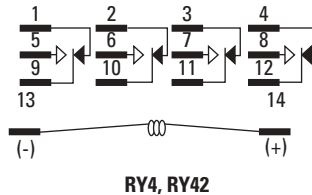
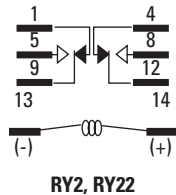


Image as viewed from bottom of relay. Refer to socket for exact wiring layout (Section F).

MiniCAS

Description:

The Flygt MiniCAS modules are relays especially designed to simultaneously supervise pump motor thermal switches and Flygt pump leakage detectors FLS (Stator housing) and/or CLS (Water-in-oil) installed in each small to medium Flygt pump (Models 3085 through 3300) or mixer (Series 4600).

The MiniCAS is using only two wires for two or more sensors connected in series and actually includes two current sensitive mini-relays. The principle of operation is: a 12 VDC voltage is sent to the pump sensors and the current through the input circuit is fed through the current mini-relays. One mini-relay is an overcurrent relay, the other is an undercurrent relay.

- If a normally closed thermal switch, installed into the stator winding, opens due to overheating, or one of the connecting leads is broken, the undercurrent relay will de-energize, changing its contacts status. The MiniCAS will shut down the pump.

- If the Flygt leakage sensor (FLS or CLS) is activated, the current through the sensor will increase and the overcurrent relay will be energized, changing the status of its contacts. The MiniCAS will send a "Leakage" signal or shut down the pump, depending on the MiniCAS external connections.

Flygt MiniCAS relays are available in two interchangeable variants:

- **CURRENT PRODUCT** - MiniCAS II/FUS produced in the U.S. with a "Manual/Auto Reset" selector switch, which allows the pump to restart in "Auto Reset" position after the stator cools down and the thermal switches re-close. (See Technical Data next page).

14-40 71 29 (MiniCAS II/FUS -120VAC /24 VAC /24 VDC)
14-40 70 97 (Socket, 11-pin) – optional

- **LEGACY PRODUCT** - MiniCAS II produced in Sweden with external manual reset after an overtemperature tripping.

83 58 57 (MiniCAS II - 24VAC)
40-50 10 98 (MiniCAS II - 120VAC)
14-40 70 97 (Socket, 11-pin) – optional

MiniCAS II/FUS-120 Technical Data (US version)

Operation Principle:	Current sensing
Environment:	-20 to 65°C (-4 to 149°F)
Supply Voltage:	120 VAC 50-60 Hz $\pm 10\%$, 24 VAC $\pm 10\%$, 24 VDC $\pm 10\%$
Relay Contact Rating:	10 Amps @ 120 VAC
Voltage to Sensor:	12 VDC $\pm 10\%$
Values of Operation:	3.0 mA < I < 22 mA = OK conditions. I $\leq$ 3.0 mA = High temp. $\pm 5\%$ (or interrupt). I $\geq$ 22.0 mA = Leakage $\pm 5\%$ (or short circuit). (I = current measured by the MiniCAS II/FUS). Green LED On = Supply Voltage present. Green LED Off = No Supply Voltage present.

Leakage

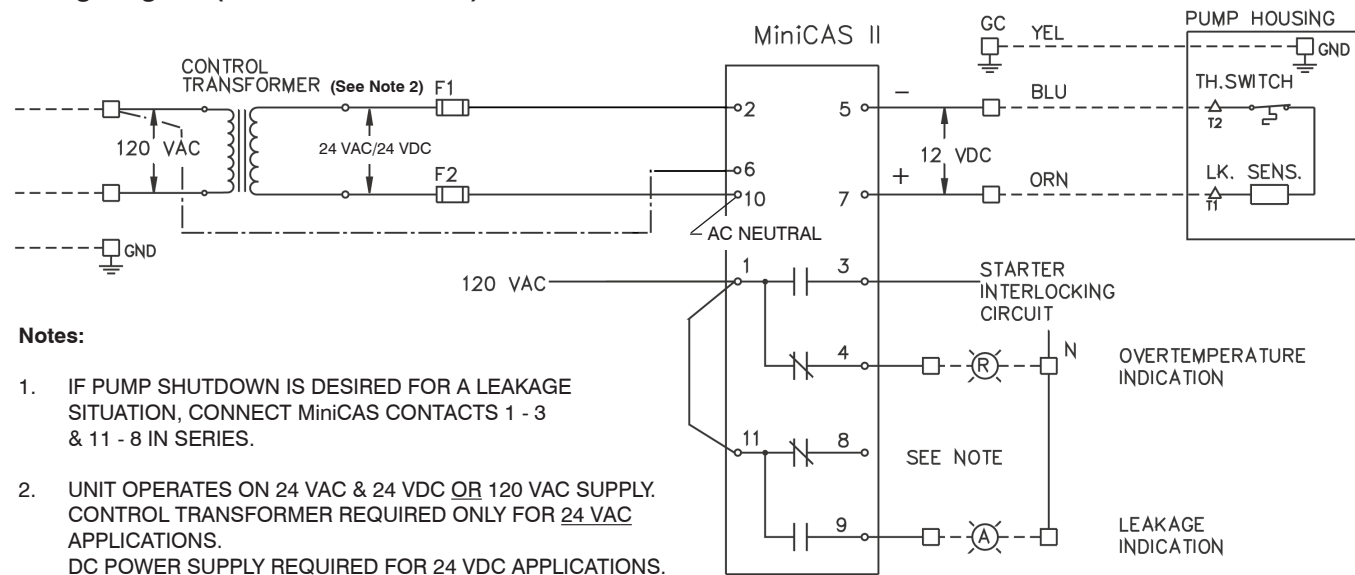
Contact:	Form "C" 10 A @ 120 VAC (N.C. contact for interlocking)
Reset:	Automatic (N.O. contact for alarm)
LED Indicators:	Red LED On = Leakage indicated Red LED Off = No leakage indicated

Temperature

Contact:	Form "C" 10 A @ 120 VAC (N.C. contact for interlocking, N.O. contact for alarm)
Reset:	Manual - by interrupting the supply for 1 sec. or by setting the toggle switch in the "Manual" mode. Automatic - by setting the toggle switch in the "Auto Reset" mode.
LED Indicators:	Red LED On = Over-temperature indicated. Red LED Off = No Over-temperature indicated
Physical Size:	Width: 2.125" Height: 4.250" Depth: 3.470" (+ socket depth)
Part Number:	14-40 71 29 (MiniCAS II/FUS -120) 14-40 70 97 (Socket, 11-pin) - optional
Approvals:	UL - File E101681

Wiring Diagram MiniCAS II/FUS-120 (US version)

Wiring Diagram (MiniCAS II/FUS-120)



Mode of Operation

In normal conditions, when the MiniCAS - 120 is powered, the green LED is 'ON' and the relay contact status is as follows:

- Overtemperature relay contacts: 1-3 closed, 1-4 open;
- Leakage relay contacts: 11-8 closed, 11-9 open.

If an overtemperature condition occurs, the overtemperature Red LED will turn on, the unit will turn the pump off and lock it out.

Relay contact status:

- Overtemperature relay contacts: 1-3 open, 1-4 closed;
- Leakage relay contacts: 11-8 closed, 11-9 open.

The power to the pump can be restored after the stator temperature has decreased to a point of safe operation and the thermal switches are closed. When the overtemperature condition resets, the overtemperature Red LED will turn off. The MiniCAS-120 can be reset either manually or automatically.

Note:

When selecting the "Automatic Reset" mode, the control panel should include a latching type circuit for over-temperature alarm display. This circuit will retain the information that an overtemperature situation has occurred and the operator should check the possible cause for motor overtemperature.

If a leakage is detected, after a 5 sec. delay, an alarm will be activated or the pump will be shut down and the leakage Red LED will turn on. Relay contact status:

- Overtemperature relay contacts: 1-3 closed, 1-4 open;
- Leakage relay contacts: 11-8 open, 11-9 closed.

Once the leakage condition is removed, power is restored to the pump and the Leakage Red LED will turn off automatically, leakage relay contacts will be reset.

MiniCAS II Technical Data (Swedish version)

Operation Principle:	Current sensing
Environment:	0-50°C (32-123°F) max 90% RH
Supply Voltages:	20-30 VAC 50-60 Hz, or 120VAC 50-60 Hz
Relay Contact Rating:	8 Amps @ 250 VAC
Voltage to Sensor:	12 VDC $\pm$ 5%
Values of Operation:	3 mA < I < 22 mA = OK conditions. I < 3 mA = High temp. (or broken wire). I > 22 mA = Leakage (or short circuit). (I = DC current measured by the MiniCAS II).
LED Indicators:	Yellow LED: for Supply Voltage presence indication. Red LED: for Overtemperature indication. Red LED: for Leakage indication.
Reset:	Manual - for Overtemperature by interrupting power supply or pushing external push-button (NO), connected between terminals 6 and 2 (not supplied with the unit). Automatic - for Leakage
Physical Size:	Width: 33mm (1.33") Height: 79mm (3.11") Depth: 75mm (2.95")
Part Number:	83 58 57 (MiniCAS II - 24VAC) 40-50 10 98 (MiniCAS II - 120VAC) 14-40 70 97 (Socket, 11 pin) – optional

MiniCAS Specifications

Furnish and install one Flygt MiniCAS (Mini Control and Status) module to monitor the temperature and leakage detectors installed in each Flygt pump or mixer. The MiniCAS shall be capable of monitoring the thermal switches embedded in the stator end coils, the Flygt FLS (float switch type) water-in-stator-housing sensor, and the Flygt CLS (capacitive type) water-in-oil sensor. The MiniCAS shall monitor both the series connected thermal switches and leakage sensor(s) by outputting 12 VDC on a single two wire circuit. When both CLS and FLS leakage sensors are specified they shall be connected in parallel with each other and then in series with the thermal switches.

The MiniCAS circuitry shall operate on the current sensing principle whereby a change in temperature or leakage condition shall change the resistance of the associated sensor and thus alter the current in the sensing circuit. The MiniCAS shall contain two sets of form C dry contacts, one for overtemperature and one for leakage. The dry

contacts shall change status upon occurrence of an over temperature or leakage condition so as to indicate that condition to other control components in the pump control panel. In the case of an overtemperature, and in keeping with Flygt's warranty policy, the overtemperature dry contacts shall be used to trip the pump off line. The MiniCAS shall be designed to be plugged into a standard 11-pin circular socket. Detailed technical data and wiring connections shall be found in the MiniCAS Manual.

Part Numbers
Part Numbers: RR Series with Options

Termination	Contact Configuration	Basic Part No.	Indicator Light	Check Button	Light and Check Button	Side Flange
P, PA (pin)	DPDT	RR2P-U	RR2P-UL	RR2P-UC	RR2P-ULC	—
	3PDT	RR3PA-U	RR3PA-UL	RR3PA-UC	RR3PA-ULC	—
B, BA (blade)	SPDT	RR1BA-U	RR1BA-UL	RR1BA-UC	RR1BA-ULC	RR1BA-US
	DPDT	RR2BA-U	RR2BA-UL	RR2BA-UC	RR2BA-ULC	RR2BA-US
	3PDT	RR3B-U	RR3B-UL	RR3B-UC	RR3B-ULC	RR3B-US



1. RR1BA, RR2BA, and RR3PA are U.S. standard terminal arrangements.
2. For diode option on DC coils please consult factory.

Ratings
Coil Ratings

Rated Voltage		Rated Current ±15% at 20°C		Coil Resistance ±10% at 20°C	Inrush Current	Inductance	
		60Hz	50Hz			Energizing	De-Energizing
AC	6V	420mA	490mA	4.9Ω	720mA	0.04H	0.02H
	12V	210mA	245mA	18Ω	365mA	0.15H	0.08H
	24V	105mA	121mA	79Ω	182mA	0.57H	0.32H
	120V	20.5mA	24mA	2100Ω	35mA	15H	8.2H
	240V	10.5mA	12.1mA	8330Ω	18mA	57H	32H
DC	6V	240mA		25Ω	N/A		
	12V	120mA		100Ω			
	24V	60mA		400Ω			
	48V	30mA		1600Ω			
	110V	13mA		8460Ω			

Contact Ratings

Voltage	Resistive			Inductive			Motor Load
	Nominal	UL	CSA	Nominal	UL	CSA	UL
30V DC	10A	10A	10A	7.5A	7A	7.5A	—
110V DC	0.5A	—	—	0.3A	—	0.5A	—
120V AC	10A	10A	10A	7.5A	7.5A	7.5A	1/4 hp
240V AC	7.5A	10A	10A	5A	7A	7A	1/3 hp



Inductive load:
 $\cos \phi = 0.3$, $L/R = 7\text{ms}$.

Applicable Sockets
Part Numbers: Sockets

Relays	Standard DIN Rail Mount	Finger-Safe DIN Rail Mount	Panel Mount
RR2P	SR2P-05 SR2P-06	SR2P-05C	SR2P-51
RR3PA	SR3P-05 SR3P-06	SR3P-05C	SR3P-51
RR1BA RR2BA RR3B	SR3B-05	—	SR3B-51

Springs & Clips (optional)	
Part Numbers	Use With Socket
SR2B-02F1	SR2P-05, -05C, -06
SR3P-01F1	SR2P-51, SR3P-51
SR3B-02F1	SR3P-05, -05C, -06 SR3B-05, -51
SR3P-01F1	SR3P-51
SR3B-02F1	SR3B-05 SR3B-51



See Section F for details on sockets. All DIN rail mount sockets listed can be mounted using DIN rail BNDN1000.

Selector Switches 3-Position (Assembled)



3-Position Selector Switches

Contact	Mounting	Operator Position			Handle	Maintained	Spring Return from Right	Spring Return from Left	Spring Return Two-Way
									
Operator Only					Knob Lever	HWⓈS-3T* HWⓈS-3L	HWⓈS-31T HWⓈS-31L	HWⓈS-32T HWⓈS-32L	HWⓈS-33T HWⓈS-33L
1NO-1NC	1	0	X	X	Knob Lever	HWⓈS-3TF11 HWⓈS-3LF11	HWⓈS-31TF11 HWⓈS-31LF11	HWⓈS-32TF11 HWⓈS-32LF11	HWⓈS-33TF11 HWⓈS-33LF11
	2	0	0	X					
2NO	1	X	0	0	Knob Lever	HWⓈS-3TF20 HWⓈS-3LF20	HWⓈS-31TF20 HWⓈS-31LF20	HWⓈS-32TF20 HWⓈS-32LF20	HWⓈS-33TF20 HWⓈS-33LF20
	2	0	0	X					
2NC	1	0	X	X	Knob Lever	HWⓈS-3TF02 HWⓈS-3LF02	HWⓈS-31TF02 HWⓈS-31LF02	HWⓈS-32TF02 HWⓈS-32LF02	HWⓈS-33TF02 HWⓈS-33LF02
	2	X	X	0					
2NO-1NC	1	X	0	0	Knob	HWⓈS-3JTF21N1	—	—	—
	2	0	0	X					
	3	0	X	0					
2NO-2NC	1	X	0	0	Knob	HWⓈS-3TF22	HWⓈS-31TF22	HWⓈS-32TF22	HWⓈS-33TF22
	2	0	0	X					
	3	0	X	X					
	4	X	X	0					
2NO-2NC	1	0	0	X	Knob	HWⓈS-3STF22N9	—	—	—
	2	X	0	0					
	3	X	X	0					
	4	0	0	X					
4NO	1	X	0	0	Knob	HWⓈS-3TF40	HWⓈS-31TF40	HWⓈS-32TF40	HWⓈS-33TF40
	2	0	0	X					
	3	X	0	0					
	4	0	0	X					
4NO	1	X	0	0	Knob	HWⓈS-3STF40N2	—	—	—
	2	0	X	X					
	3	X	0	0					
	4	0	0	X					
4NC	1	0	X	X	Knob	HWⓈS-3TF04	HWⓈS-31TF04	HWⓈS-32TF04	HWⓈS-33TF04
	2	X	X	0					
	3	0	X	X					
	4	X	X	0					

HAND-OFF-AUTO
ON-OFF-TEST

⑤ Bezel Type

Type	Code
Plastic	1
Metal	4



- In place of Ⓢ enter 1 for plastic bezel or 4 for metal bezel.
- Knob operator includes black knob/lever operator includes black lever.
- * Three position operator is available with three different cams.
HWⓈS-3T: Maintained (standard cam)
HWⓈS-3ST: Maintained (S cam)
HWⓈS-3JT: Maintained (J cam)
- Operator cams are color coded (white=standard cam, red=S cam, black=J cam).
- For nameplates, see page 546.
- For contact assembly part numbers, see page 550.
- All assembled part numbers in catalog include standard fingersafe (HW-F...) contacts.
- Assembled units with spring-up terminals (HW-G...) can be ordered by removing an "F" from the part number (Ex. HW1B-M1F11-R becomes HW1B-M111-R).
- Units with exposed screw terminals (HW-C...) must be ordered as sub-components.
- Standard color for knob and lever is black.
- Optional colors available for lever type. Must order in components. See next page for part numbers.
- Additional contact configurations available (up to 6 total contacts).
- For Truth Tables see page 558.

Non-illuminated Round Pushbuttons (Assembled)



Function	Contacts	Round Flush		Round Extended	
		Plastic Bezel	Metal Bezel	Plastic Bezel	Metal Bezel
Momentary	Operator Only	HW1B-M1-①	HW4B-M1-①	HW1B-M2-①	HW4B-M2-①
	1NO	HW1B-M1F10-①	HW4B-M1F10-①	HW1B-M2F10-①	HW4B-M2F10-①
	1NC	HW1B-M1F01-①	HW4B-M1F01-①	HW1B-M2F01-①	HW4B-M2F01-①
	1NO-1NC	HW1B-M1F11-①	HW4B-M1F11-①	HW1B-M2F11-①	HW4B-M2F11-①
	2NO	HW1B-M1F20-①	HW4B-M1F20-①	HW1B-M2F20-①	HW4B-M2F20-①
	2NC	HW1B-M1F02-①	HW4B-M1F02-①	HW1B-M2F02-①	HW4B-M2F02-①
	2NO-2NC	HW1B-M1F22-①	HW4B-M1F22-①	HW1B-M2F22-①	HW4B-M2F22-①
Maintained	Operator Only	HW1B-A1-①	HW4B-A1-①	HW1B-A2-①	HW4B-A2-①
	1NO	HW1B-A1F10-①	HW4B-A1F10-①	HW1B-A2F10-①	HW4B-A2F10-①
	1NC	HW1B-A1F01-①	HW4B-A1F01-①	HW1B-A2F01-①	HW4B-A2F01-①
	1NO-1NC	HW1B-A1F11-①	HW4B-A1F11-①	HW1B-A2F11-①	HW4B-A2F11-①
	2NO	HW1B-A1F20-①	HW4B-A1F20-①	HW1B-A2F20-①	HW4B-A2F20-①
	2NC	HW1B-A1F02-①	HW4B-A1F02-①	HW1B-A2F02-①	HW4B-A2F02-①
	2NO-2NC	HW1B-A1F22-①	HW4B-A1F22-①	HW1B-A2F22-①	HW4B-A2F22-①

① Button Color Code

Color	Code
Black	B
Green	G
Red	R
Blue	S
White	W
Yellow	Y
Gray	N*



*Gray available for round flush only.



1. In place of ①, specify the Button Color Code from table below.
2. For nameplates and accessories, see page 546 and 549.
3. For dimensions, see page 551.
4. For contact assembly part numbers, see page 550.
5. All assembled part numbers in catalog include standard, fingersafe (HW-F...) contacts.
6. Assembled units with spring-up terminals (HW-G...) can be ordered by removing an "F" from the part number (Ex. HW1B-M1F11-R becomes HW1B-M111-R).
7. Operator only models include operator plus button.
8. Additional contact configurations available (up to 6 total contacts).

Pilot Lights (Assembled)



		Round Flush		Dome	
		Plastic Bezel	Metal Bezel	Plastic Bezel	Metal Bezel
Operator Only		HW1P-1FQ0-②	HW4P-1FQ0-②	HW1P-2FQ0-②	HW4P-2FQ0-②
Full Voltage		HW1P-1FQ④-②-③	HW4P-1FQ④-②-③	HW1P-2FQ④-②-③	HW4P-2FQ④-②-③
Transformer	120V AC	HW1P-1FH2④-②	HW4P-1FH2④-②	HW1P-2FH2④-②	HW4P-2FH2④-②
	240V AC	HW1P-1FM4④-②	HW4P-1FM4④-②	HW1P-2FM4④-②	HW4P-2FM4④-②
	480V AC	HW1P-1FT8④-②	HW4P-1FT8④-②	HW1P-2FT8④-②	HW4P-2FT8④-②
DC-DC Converter*	110V DC	HW1P-1D2D-②	—	HW1P-2D2D-②	—



		Square Flush
		Plastic Bezel
Operator Only		HW2P-1FQ0-②
Full Voltage		HW2P-1FQ④-②-③
Transformer	120V AC	HW2P-1FH2④-②
	240V AC	HW2P-1FM4④-②
	480V AC	HW2P-1FT8④-②
DC-DC Converter*	110V DC	HW2P-1D2D-②

② Lens/LED Color Code

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y

③ Full Voltage Code

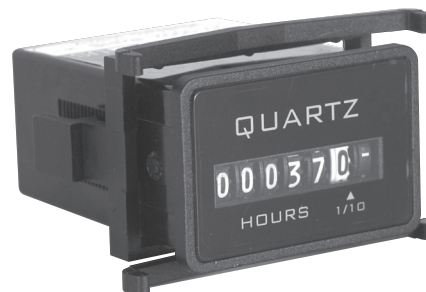
Voltage	Code
6VAC/DC	6V
12VAC/DC	12V
24VAC/DC	24V
120V AC (LED only)	120V
240V AC (LED only)	240V

④ Lamp Type Code

Lamp	Code
Incandescent	Blank
LED	D



1. In place of ②, specify the Lens/LED Color Code from table below.
2. In place of ③ specify the Full Voltage Code from table below.
3. In place of ④ specify Lamp Type Code from table below.
4. *DC-DC converter voltage input from 90-140V DC, comes with spring-up terminals only.
5. DC-DC converter models with LED lamps only.
6. For nameplates and accessories, see page 546 and 549.
7. For dimensions, see page 551.
8. **Pilot lights do not come with anti-rotation ring.**
9. Operator models come with operator and lens.
10. **Yellow pilot light comes with white LED.**



Description

The Redington Model 722 provides an AC Hour Meter with an operating range of 90-264VAC 50/60 Hz. You no longer require two separate meters, one for 115VAC and one for 230VAC. Models are available in the standard industry housings, 2-Hole Rectangular, Flush-Rectangular, Flush-Round and 3-Hole Round. Its quartz time base insures accurate long-term time keeping. The Totally Sealed case protects against the environment and provides years of reliable service. All models are NEMA 4X,12 rated when mounted with optional gasket.

Features

- Operating voltage 90-264VAC 50/60Hz
- Totally Sealed
- UL/cUL Recognized, CE & RoHS Compliant
- 6 Figure, 99999.9
- Quartz accuracy

Options

- Wire leads
- Gasket kit (for NEMA 4X, 12 rating)
- Custom lens
- Terminals up, down, straight

Specifications

Figures:	6 - digits, 0.14" [3.6mm] 99999.9 Hours and indicator - white on black Decimal - black on white
Reset:	Non-reset
Voltage:	90-264VAC
Frequency:	50/60Hz
Power:	1 watt max.
Mounting:	Clip or mounting holes
Termination:	¼" [6.3mm] spade terminals
Weight:	~2 oz [57 g]
Accuracy:	± 0.02% over entire range

Case Material:	Black polymer
Lens Material:	Polymer
Agency Approvals:	UL/cUL Recognized, CE & RoHS Compliant, SAE & NEMA 4X, 12 Compliant
Environmental:	Totally Sealed
Front Panel:	NEMA 4X, 12 rated with optional gasket
Temperature:	-40°F to +185°F [-40°C to + 85°C]
Humidity:	95% (SAE J1378)
Vibration:	10-80 Hz, 20g max. (SAE J1378)
Shock:	55g @ 9 - 13msec (SAE J1378)

Models

Description

722-0001	2-Hole Rectangular, 90-264VAC 50/60Hz, ¼" [6.3mm] spade terminals, hours & 1/10's
722-0002	Flush-Rectangular, 90-264VAC 50/60Hz, ¼" [6.3mm] spade terminals, hours & 1/10's
722-0003	Flush-Round, 90-264VAC 50/60Hz, ¼" [6.3mm] spade terminals, hours & 1/10's
722-0004	3-Hole Round, 90-264VAC 50/60Hz, ¼" [6.3mm] spade terminals, hours & 1/10's

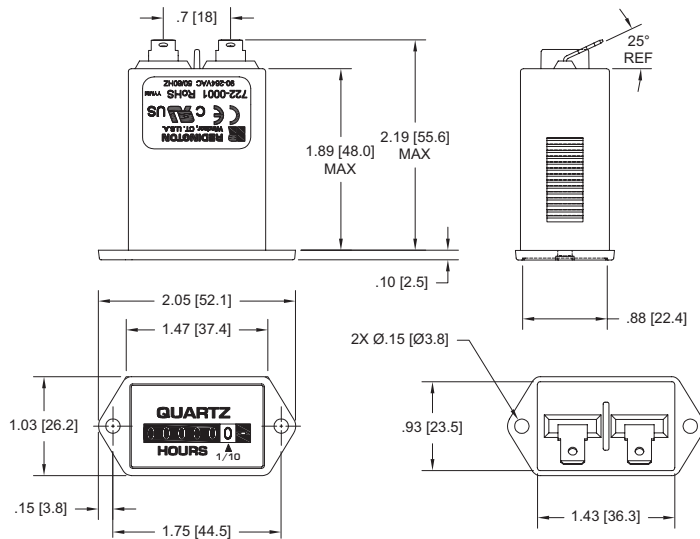
5003-009	NEMA 4X, 12 Gasket for Model 722-0002
5003-010	NEMA 4X, 12 Gasket for Model 722-0001
5003-011	NEMA 4X, 12 Gasket for Model 722-0004
5003-008	NEMA 4X, 12 Gasket for Model 722-0003

* All items are normally in factory stock



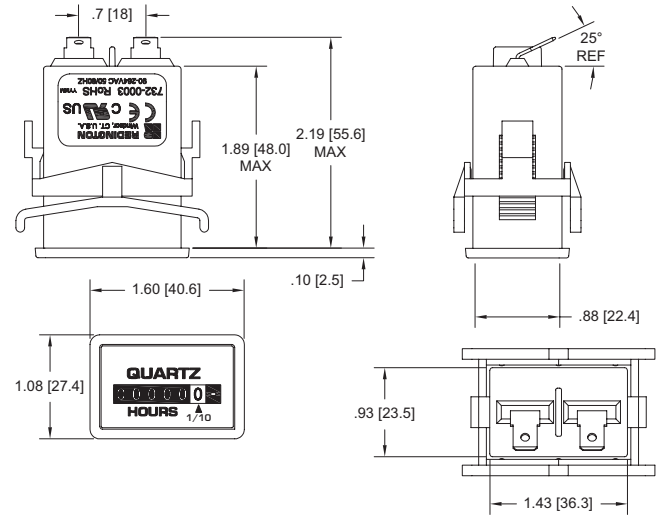
Dimensions

2-Hole

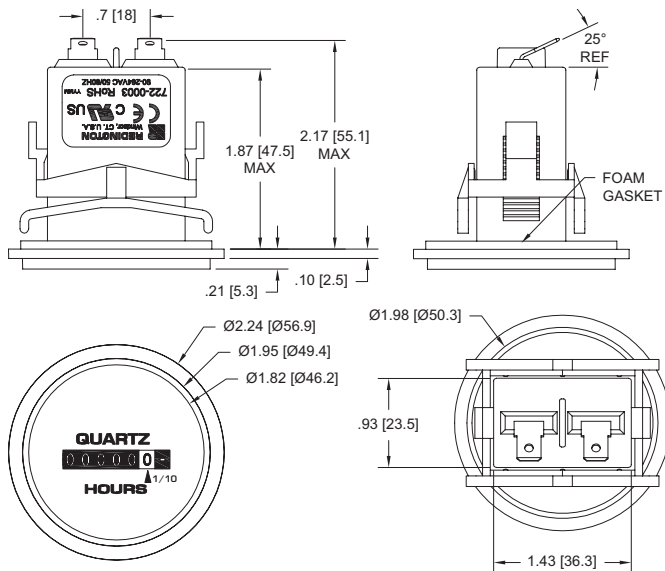


Panel Opening: 1.45" X 0.95" [36.8 X 24.1]

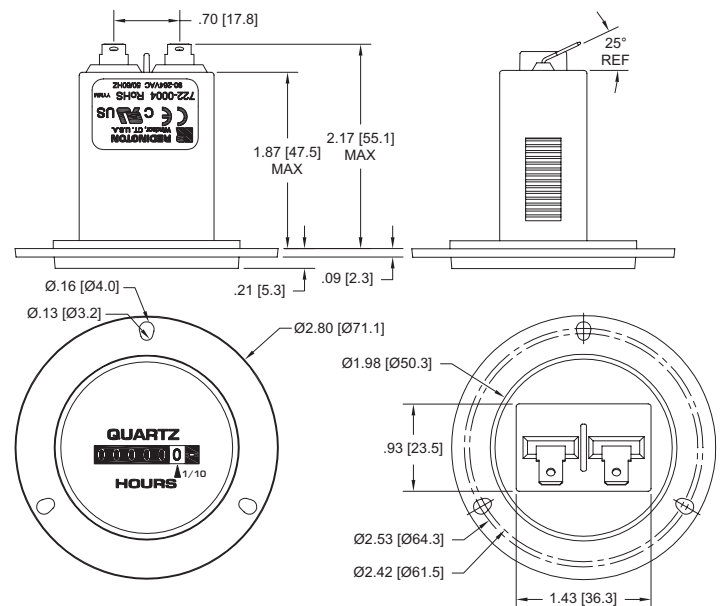
Flush-Rectangular

Panel Opening: 1.45" X 0.95" [36.8 X 24.1]
Panel Thickness: 0.03 to 0.63 [0.76 to 16.00]

Flush-Round

Panel Opening: 2.0" [50.6]
Panel Thickness: 0.40 [10.2] Max.

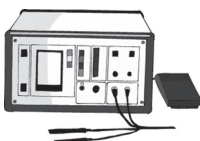
3-Hole Round



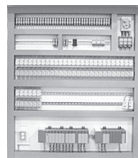
Panel Opening: 2.0" [50.6]

Applications

Medical Equipment



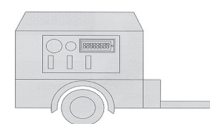
Control Panels



Test Equipment



Generators



Office Equipment



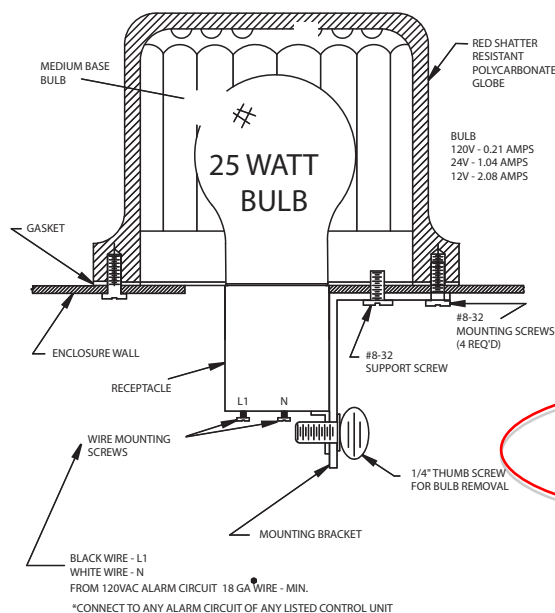


OHIO ELECTRIC
CONTROL, INC.

ACCESSORIES

Alarm Light RL-3 High Intensity

- Lexan lens magnifies and intensifies light
- Available in 4 colors: Red, Blue, Amber, and Green
- Flanged lens base and gasket creates watertight seal on enclosure
- Interior mounting screws require no sealing
- Easy bulb replacement
- Rugged lens resists damage
- Low profile design
- UL Type 4X recognized
- Medium base socket with screw terminal
- Fast and simple mounting
- Available in kit form: including 4 self-tapping screws, a nylon thumbscrew, light bulb, socket, light mounting bracket, and rubber gasket. Add (K) to part number when ordering a kit.



Part Number

RL - 3 (Lens Color) (Kit)

Example: RL-3K

INSTALLATION - ALL MODELS ARE SUITABLE FOR EITHER INDOOR OR OUTDOOR TYPE 2, 3, 3S, 3R, 4, 4X, OR 12 USE.

LIGHT COMES COMPLETE WITH:
RED POLYCARBONATE LENS
CLOSED CELL NEOPRENE GASKET
BULB SOCKET
CLEAR INTENSITY BULB
NYLON SCREW
LOCKNUT

QUICK SIMPLE BULB REPLACEMENT
REMOVE NYLON SCREW FROM BASE
AND LOWER BULB

ONLY ONE PUNCHED HOLE REQUIRE FOR MOUNTING
1 - 15/16" DIA. PUNCH OR A
1 - 1/2" CONDUIT PUNCH

Accessories

Call, e-mail, or fax us your order today.

Phone: (419) 289-1553 Fax (419) 289-5555 E-mail: oecinc@oecinc.net

www.oecinc.net

Timing Mode: **REPEAT CYCLE**

Category: **FLASHER**

Series: **TEKR**

ROUND SOLID STATE FLASHER, UNIVERSAL AC/DC WIDE VOLTAGE



TEKR Flashers

These are an ideal substitute for mechanical flashers. The primary design benefits are small size and ease of installation and hook-up.

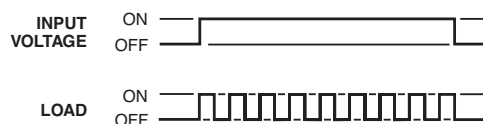
The CMOS timing provides excellent accuracy and repeatability.

Timing Mode

Application of input voltage to the timer starts the time delay.

At the end of the delay period the load is energized.

To reset, remove the input voltage to the flasher.

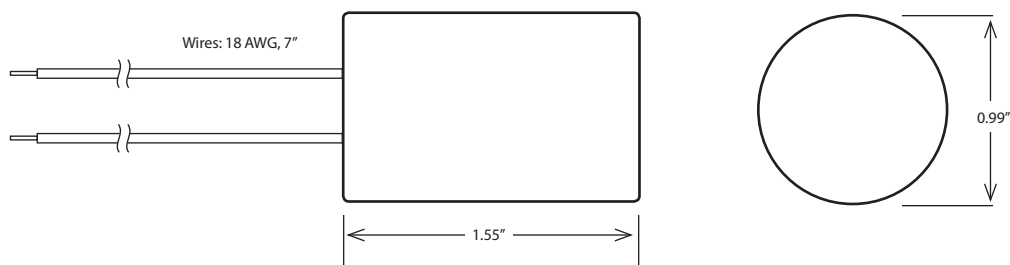


FEATURES

- Digital timing, solid state output
- Up to 1 Amp current load handling
- 10 Amps single cycle surge handling
- Wide voltage range from 24 to 240VAC and 12 to 48VDC
- $\pm 0.5\%$ Repeat accuracy
- No moving parts
- Totally encapsulated for protection from harsh environments
- Surface mount with bracket
- Standard wire leads
- 100% operational testing before shipping
-  RoHS compliant

011311

BASIC WIRING AND DIMENSIONS



SPECIFICATIONS

Input Voltage: *Universal:* 12–48VDC, 24–240VAC

Repeat Accuracy: $\pm 0.5\%$ under fixed conditions

Flashes per Minute: Factory fixed at 60, 75, 90 or 120fpm

Tolerances: Fixed at 10% of nominal time

Temperature Ranges: *Storage:* -40°C to +85°C
Operating: -25°C to +65°C

Life Expectancy: No predictable failure if used within operating parameters

Protection: Internal MOV

Solid State Output: N.O.

Load Current: 1 amp switching,
10 amps single-cycle surge

Time Cycle Interrupt: Input voltage break resets flasher to original state

OPTIONS SELECTION

Mode of Operation	Series	Universal Input Voltage	Factory Fixed Flashes per Minute	Time Adjustment Method	Options
Repeat Cycle Flasher	TEKR	U 12–48VDC 24–240VAC	060 60 fpm 075 75 fpm 090 90 fpm 120 120 fpm	C Fixed, internal, factory set	W Wires

EXAMPLE TEKR U 075 C W is a universal voltage TEKR series flasher factory set at 75 fpm.

AudioLarm II

MW-09-201-Q



More Information

Warble Tone

 [Spec Sheet](#)

 [UL Recognized](#)

 RoHS Compliant

Specifications Revision: 10.14

Medium Loud Warble Tone; Extra Fast Rate; Panel Mount Case and Quick Connect Blades Termination

Mounting:

Panel Mount

Operating Mode:

Medium Loud Extra Fast Warble Tone

Operating Voltage:

30-120 Vac

Operating Frequency:

5 mA at 30 Vac

20 mA at 120 Vac

Typical Sound Pressure:

85±5 dB(A), at 30 Vac, at 24 inches (61 cm), at 25°C
95±5 dB(A), at 120 Vac, at 24 inches (61 cm), at 25°C

Termination:

Quick Connect Blades

Termination Strength:

Pull test with a maximum of 22 pounds (10 kg) load

Operating Temperature:

-20_C to +65_C

Storage Temperature:

-40_C to +85_C

Surge Voltage:

20% over maximum rated voltage for less than 5 minutes

Reverse Voltage Protection:

To the maximum operating voltage

Construction Materials:

Internal Circuit- Audio-oscillator and piezoelectric driver
Potting- 2 parts epoxy resin or silicone, black
Diaphragm- Stainless Steel 304

Gasket:

Environmental Durability:

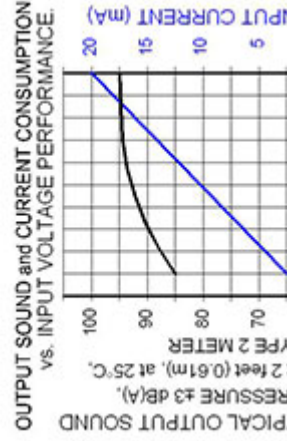
ASTM B117 Certified - Withstands exposure to salt spray for 300 hours
IP 68 Certified - Withstands water submergence and dust exposure
Humidity- 95% relative humidity at +40_C continuously for 100 hours.
Vibration- Withstands vibration between 0 and 55 Hz. on all axes.

Life Expectancy:

10 years under normal operating conditions.

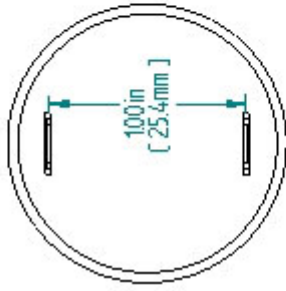
Warranty:

For a period of two years from the date of manufacture under normal operating conditions.

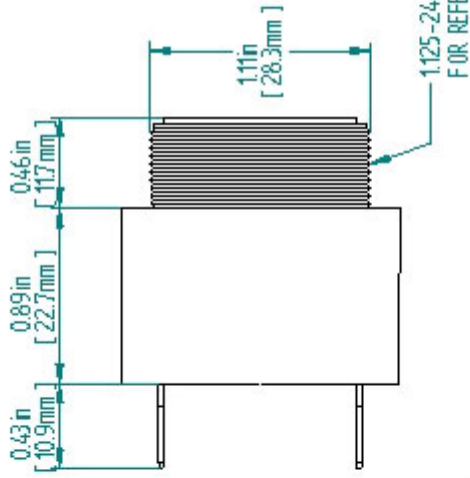


Dimensions

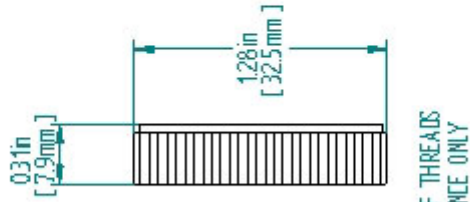
REAR



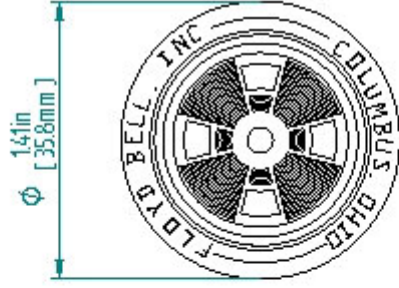
SIDE



RING



FRONT

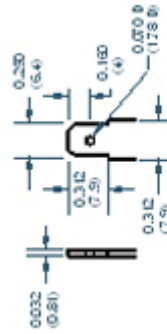


PANEL MOUNTING



TOLERANCES ARE: ± 0.03 in.
[± 0.76 mm]

"Q" TERMINALS



Metallized Polyester Film Capacitor

Type: **ECQE(F)**

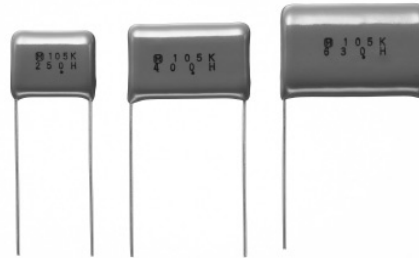
Non-inductive construction using metallized Polyester film with flame retardant epoxy resin coating

■Features

- Self-healing property
- Excellent electrical characteristics
- Flame retardant epoxy resin coating
- RoHS directive compliant

■Recommended Applications

- General purpose usage
- ※Please contact us when applications are CD I , ignitor etc.



ECQE2823JF

■Explanation of Part Numbers

1	2	3	4	5	6	7	8	9	10	11	12
E	C	Q	E							F	
Product code		Dielectric & construction		Rated volt.		Capacitance		Cap. Tol.		Suffix	Suffix
				1	100 VDC	10	1000 VDC	J	±5 %	Suffix	Lead Form
				2	250 VDC	12	1250 VDC	K	±10 %	Blank	Straight
				4	400 VDC	1A	125 VAC			B	Crimped lead
				6	630 VDC	2A	250 VAC			Z	Cut lead
										3	Crimped taping (Ammo)
										6	Crimped taping (Ammo)

●Explanation of Part Number for Odd Size Taping

1	2	3	4	5	6	7	8	9	10	11	12
E	C	Q	E						R		F
Product code		Dielectric & construction		Rated volt.		Capacitance		Suffix	Cap. Tol.	Suffix	

■Specifications

Category temp. range (Including temperature-rise on unit surface)	100 VDC, 250 VDC, 400 VDC, 630 VDC, 1000 VDC, 1250 VDC, 125 VAC, 250 VAC	-40 °C to +105 °C -40 °C to +105 °C
Rated voltage	100 VDC, 250 VDC, 400 VDC, 630 VDC, 1000 VDC, 1250 VDC, (Derating of rated voltage by 1.25 %/°C at more than 85 °C) 125 VAC, 250 VAC	
Capacitance range	0.0010 μF to 10 μF (E12)	
Capacitance tolerance	±5 % (J), ±10 % (K)	
Dissipation factor (tanδ)	tanδ ≤ 1.0 % (20 °C, 1 kHz)	
Withstand voltage	●Rated volt. 100 V to 630 VDC Between terminals : Rated volt.(VDC)×150 % 60 s	
	●Rated volt. 1000 VDC, 1250 VDC Between terminals : Rated volt. (VDC)×175 % 2 s to 5 s or 1000 VAC 60 s Between terminals to enclosure : 1500 VAC 60 s	
	●Rated volt. 125 VAC, 250 VAC Between terminals : Rated volt.(VAC)×230 % 60 s Between terminals to enclosure : 1500 VAC 60 s	
Insulation resistance (IR)	100 V to 630 VDC: C ≤ 0.33 μF : IR ≥ 9000 MΩ (20 °C, 100 VDC, 60 s) C > 0.33 μF : IR ≥ 3000 MΩ · μF	
	1000 VDC, 1250 VDC: IR ≥ 10000 MΩ (20 °C, 100 VDC, 60 s) IR ≥ 2000 MΩ (20 °C, 500 VDC, 60 s)	
	125 VAC, 250 VAC: C ≤ 0.47 μF : IR ≥ 2000 MΩ (20 °C, 500 VDC, 60 s) C > 0.47 μF : IR ≥ 3000 MΩ · μF (20 °C, 100 VDC, 60 s)	

※ In case of applying voltage in alternating current (50 Hz or 60 Hz sine wave) to a capacitor with DC rated voltage, please refer to the page of "Permissible voltage (R.M.S) in alternating current corresponding to DC rated voltage".

※ Voltage to be applied to ECQE1A (F) & ECQE2A (F) is only sine wave (50 Hz or 60 Hz).

Design, Specifications are subject to change without notice. Ask factory for technical specifications before purchase and/or use.
Whenever a doubt about safety arises from this product, please inform us immediately for technical consultation without fail.