



## Submittal Transmittal

**Project:** Pike Addition Lift Station near Maple & 151<sup>st</sup> St.

**City of Wichita Project Number:** 468-2019-005340

**Contractor Project Number:** 20059

**Submittal Number:** 1-01

**Subcontractor/Supplier:** Enviro-Line

**Description:** KSB Pumps & Accessories

**Date Submitted:** May 26, 2020

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### Stamp Area

 <b>BAUGHMAN</b>	315 ELLIS   WICHITA, KS 67211 [P] 316-262-7271 [BaughmanCo.com]
<input checked="" type="checkbox"/> REVIEWED ONLY	BY: _____ TPV _____
<input type="checkbox"/> REVIEWED AS NOTED	
<input type="checkbox"/> REJECTED	DATE: _____ 5-1-2020 _____



*EnviroLine co., inc.*

409 SIXTH STREET P.O. BOX 308 OSAWATOMIE, KS 66064

SUBMITTALS

PROJECT

Pike Addition Lift Station  
Wichita, KS

CONTRACTOR

McCullough Excavation, Inc.  
Wichita, KS

ENGINEER

Baughman  
Wichita, KS

EQUIPMENT MANUFACTURER

KSB Pumps – Richmond, VA

SUPPLIER

Enviro-Line Company, INC  
409 Sixth Street  
Osawatomie, KS 66064  
Phone: 913.755.2161

April 29, 2020

**WATER AND WASTEWATER EQUIPMENT FOR THE ENVIRONMENTAL INDUSTRY**

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**Website: [www.enviro-line.com](http://www.enviro-line.com)**

# PIKE ADDITION LIFT STATION WICHITA, KANSAS

FROM

## ENVIRO-LINE CO. INC.

913-755-2161  
913-755-3018 FAX  
OSAWATOMIE, KS

P.O. BOX 308 \* OSAWATOMIE, KANSAS 66064

913-782-4443  
KANSAS CITY AREA

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Two(2)	KSB-KRT F100-250/164XEG-S 20hp
Two(2)	Pump attaching Claws & Base Elbows
Two(2)	SST Upper & Intermediate Brackets
Lot	SST Chain Packages
Two(2)	Pump Cord Kellum Grips
Lot	2" Schedule SST Guide Rails
One(1)	Primex Arc Armor Control Panel
One (1)	Primex Levelrat Transducer
One (1)	Primex KwikSwitch Float System
One (1)	SS Float Support Bracket
One(1)	FRP Building 8' x 10'

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Lift Station to serve Pike Addition  
 Wichita, KS



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 Update 4/17/2020

**Data sheet**

**Pump type**

**KRT F 100-250/164XG-S**

**Operating data**

Flow	405	US g.p.m.	Fluid		
Head	70.2	ft	Density of fluid	64.3	lb/ft <sup>3</sup>
Operating speed	1750	rpm	Viscosity	1.08E-5	ft <sup>2</sup> /s
Shaft power	15.1	hp	Temperature	68	°F
Efficiency	49.3	%			
Required pump NPSH	15.5	ft			
Head H(Q=0)	86.2	ft			
Application range	Head		Flow		
	From	86.2 ft	0	US g.p.m.	
	To	29.8 ft	947	US g.p.m.	

**Design**

Make	KSB	Impeller type	Vortex
Design	Submersible pump		Open
Series	KRT F	Impeller size	( 249 ) 10 inch
Frame size	100-250		Max. ( 265 ) 10 inch
Stages	1		Min. ( 166 ) 7 inch
Curve number	K42071s/04	Free passage	4 inch
		Weight	lb
Type of bearings	Antifriction		
Nos. of bearings	1 / 1		
Lubrication	Grease lubrication. lubricated for lifetime		
Suction port	Pressure rating	--	
	Flange size	DN0	---
	Flange size	DN1	4"
	Norm	--	
Discharge port	Pressure rating	CLASS 125	
	Flange size	DN2	4 inch
	Flange size	DN3	4 inch
	Norm	ASME/ANSI B16.1	
Suction port: pump (DN1)		Discharge port: discharge elbow (DN3)	

**Materials**

Pump casing	Grey cast iron EN-GJL-250 (A 48 Class 35B)
Discharge cover	Grey cast iron EN-GJL-250 (A 48 Class 35B)
Impeller	Grey cast iron EN-GJL-250 (A 48 Class 35B)
Shaft	Stainless steel EN-1.4021+QT800 (A 276 Type 420)
Bearing bracket	Grey cast iron EN-GJL-250 (A 48 Class 35B)
Motor casing	Grey cast iron EN-GJL-250 (A 48 Class 35B)
Bolts. nuts	Stainless steel A4 (EN-1.4571) (A 276 Type 316)
Shaft protection sleeve	---
Casing wear ring	
Impeller wear ring	
O-Rings	Nitrile rubber (NBR)

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## Data sheet

### Pump type

**KRT F 100-250/164XG-S**

### Shaft seal

Type of seal	Double mechanical seal
Arrangement:	Tandem
Seal on medium side	with elastomer bellows
Mechanical seal. pump-side	Silicon carbide / Silicon carbide
Mechanical seal. bearing-side	Carbon / Silicon carbide

### Monitoring

Thermal winding protection	By temperature sensitive switches
Explosion proof protection	By PTC (Explosion proof models only)
Motor housing monitoring	By conductive moisture sensor electrode
Mechanical seal leakage detection	---
Bearing temperature monitoring	---

### Coating

Preparatory treatment	SSPC near white SP 10
Blasting method	Steel grit blasting
Primer	Zinc phosphate or Zinc dust
Dry film thickness primer	> 1 1/2 mils (35 microns)
Top coat	2-component epoxy resin
Solids content	> 82 %
Dry film thickness top coat	> 6 mils (150 microns)
Color	Ultramarine Blue (RAL 5002 to DIN 6174)

### Installation

#### INSTALLATION

Type of installation:	Wet well installation designed for
automatic connection to a permanently installed discharge elbow	
Discharge elbow size (DN2/DN3):	4 inch / 4 inch
Flange to suit:	ASME/ANSI B16.1, CLASS 125
Claw:	Bolted to the pump
Guide system:	Double guide bars, by contractor
Guide bar dimension:	2" diameter pipes
Installation depth:	33 ft (10 m)
Lifting device:	stainless steel lifting chain
Length of lifting device:	33 ft (10 m)
Lifting loops:	Every 8 ft (2.5 m )
Installation accessories:	Discharge elbow, 4 inch / 4 inch
fasteners, claw, bracket, lifting chain, but without guide bars	
Materials:	
Discharge elbow:	Grey cast iron EN-GJL-250 (A 48 Class 35B)
Claw:	Grey cast iron EN-GJL-250 (A 48 Class 35B)
Bracket:	Stainless steel EN-1.4571 (A 276 Type 316 Ti)
Lifting device:	Stainless steel EN-1.4404 (A 276 Type 316L)

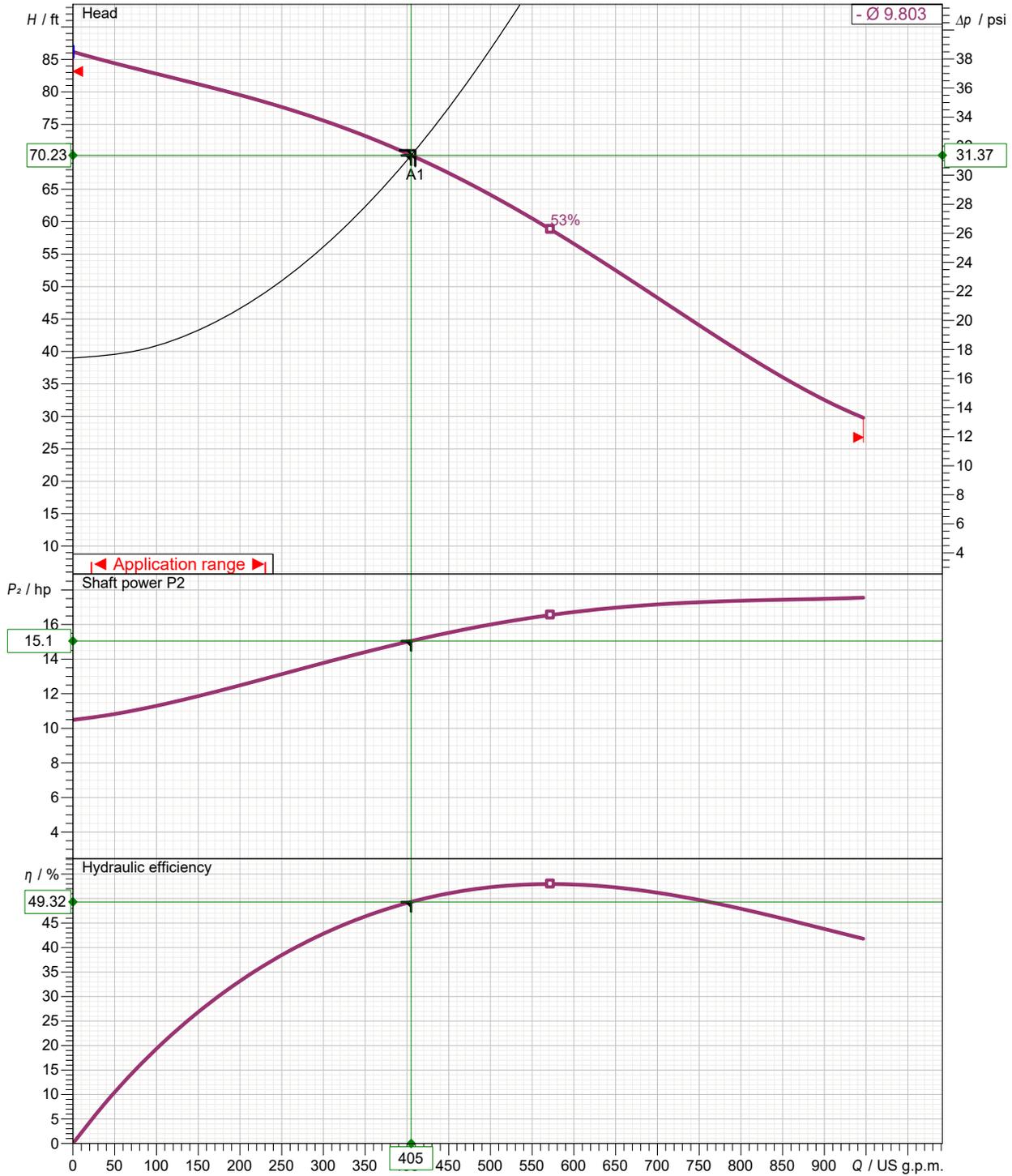
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**Performance curve**

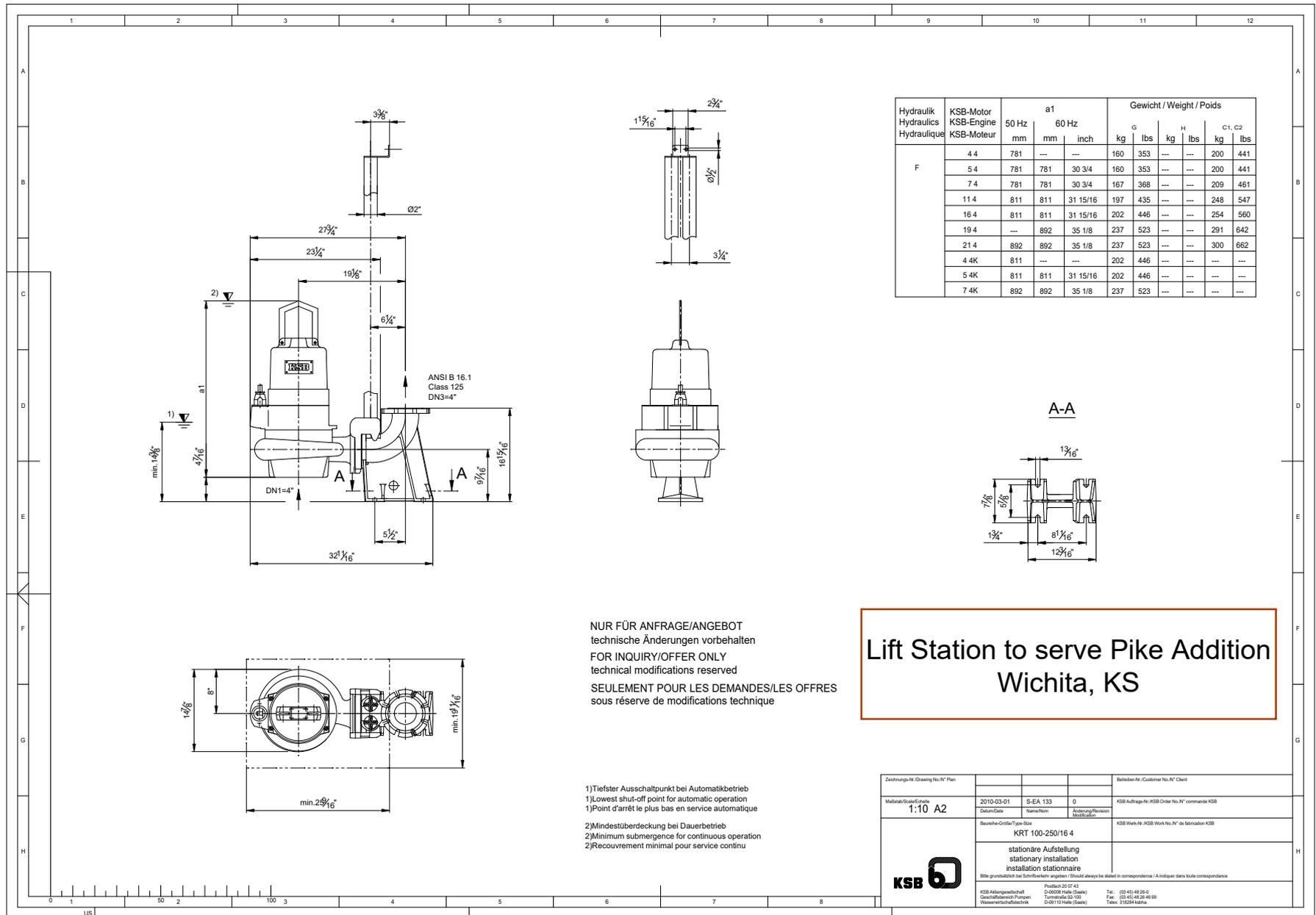
**Pump type** KRT F 100-250/164XG-S



Impeller type	Vortex	, Open	Curve number	K42071s/04	
Free passage	4 inch	Density of fluid	62.322 lb/ft³	Frequency	60 Hz
Impeller size	10 inch	(249 ) Viscosity	1.082E-5 ft²/s	Speed	1750 1/min

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Hydraulik Hydraulics Hydraulique	KSB-Motor KSB-Engine KSB-Moteur	a1			Gewicht / Weight / Poids					
		50 Hz	60 Hz		G		C1, C2			
		mm	mm	inch	kg	lbs	kg	lbs		
F	4.4	781	---	---	160	353	---	---	200	441
	5.4	781	781	30 3/4	160	353	---	---	200	441
	7.4	781	781	30 3/4	167	368	---	---	209	461
	11.4	811	811	31 15/16	197	435	---	---	248	547
	16.4	811	811	31 15/16	202	446	---	---	254	560
	19.4	---	892	35 1/8	237	523	---	---	291	642
	21.4	892	892	35 1/8	237	523	---	---	300	662
	4.4K	811	---	---	202	446	---	---	---	---
	5.4K	811	811	31 15/16	202	446	---	---	---	---
	7.4K	892	892	35 1/8	237	523	---	---	---	---

NUR FÜR ANFRAGE/ANGEBOT  
 technische Änderungen vorbehalten  
 FOR INQUIRY/OFFER ONLY  
 technical modifications reserved  
 SEULEMENT POUR LES DEMANDES/LES OFFRES  
 sous réserve de modifications technique

Lift Station to serve Pike Addition  
 Wichita, KS

- 1) Tiefster Ausschaltpunkt bei Automatikbetrieb
- 1) Lowest shut-off point for automatic operation
- 1) Point d'arrêt le plus bas en service automatique
- 2) Mindestüberdeckung bei Dauerbetrieb
- 2) Minimum submergence for continuous operation
- 2) Recouvrement minimal pour service continu

Zeichnungs-Nr./Drawing No./N° Plan				Betriebs-Nr./Customer No./N° Client
Maßstab/Scale/Échelle	2010-03-01	S-EA 133	0	KSB Auftrags-Nr./KSB Order No./N° commande KSB
1:10 A2	Datum/Date	Version/Version	Änderung/Revision/Modification	
	Bauweise/Order Type/Size	KRT 100-250/16 4		KSB Werk-Nr./KSB Work No./N° de fabrication KSB
	stationäre Aufstellung stationary installation Installation stationnaire			
Bitte grüezielich bei Schriftverkehr angeben / Should always be stated in correspondence / A indiquer dans toute correspondance				
KSB AG Geschäftsbereich Pumpen Messerschmidstr. 6		Postfach 20 07 43 D-69126 Heidelberg Telefon 06221 40-100 Fax 06221 40-1010		Telefon 033 451 44 26-0 Fax 033 451 44 26 49 99 Telefax 033 451 44 26 49 99

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 Pos.no

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 4/17/2020

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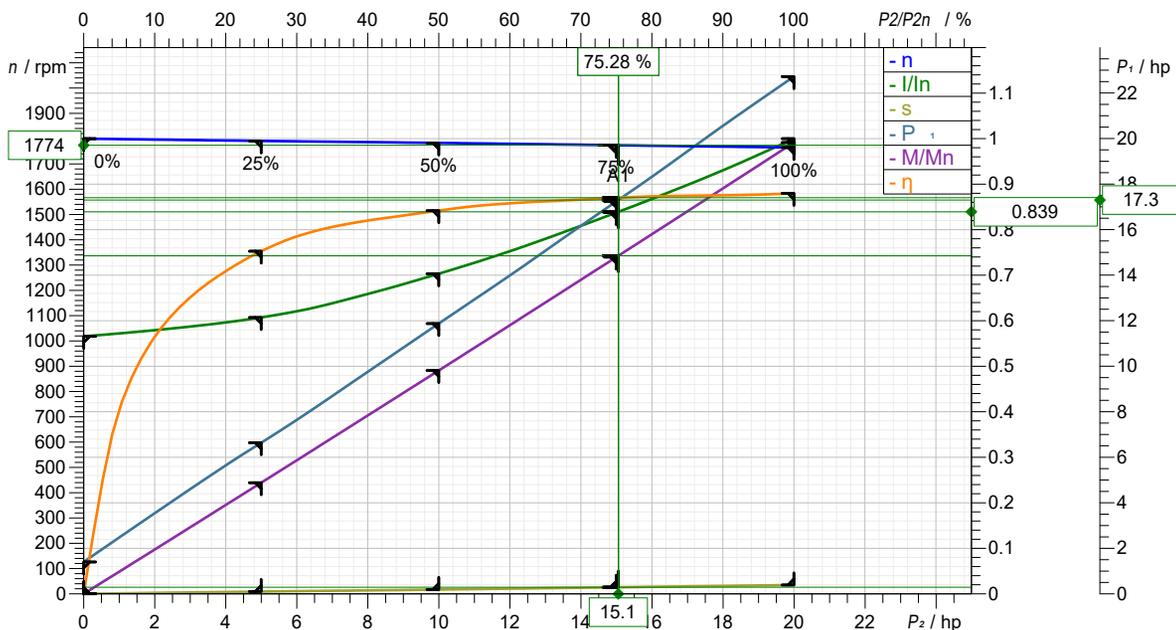
Data sheet: Motor data

Motor type **164XG**

Motor manufacturer	KSB SE & Co. KGaA	Rated voltage	460	V
Design acc. standard	-	Rated frequency	60	Hz
Service factor	1.15	Rated HP (D.O.L) or VFD	20	hp
Degree of protection	IP68	Rated current	29	A
Insulation class	F	Nominal speed	1765	rpm
Starting mode	Direct starting	NEMA code letter	K	
No. starts / h	20	Starting to rated current	7.6	
Coolant temperature	< / = 104 °F (40 °C)	Starting current	220.4	A
Motor casing	Grey cast iron EN-GJL-250 (A 48 Class 35B)			
Explosion protection	Class I, Div. 1, Groups C,D, T3			
Pump type	KRT F 100-250/164XG-S			

Load	P1 kW	P2 hp	eta %	cos phi	I A
4/4	16.94	20.0	88.0	0.73	29.0
3/4	12.86	15.0	86.9	0.66	24.3
2/4	8.86	10.0	84.1	0.54	20.4
1/4	4.95	5.0	75.2	0.35	17.6

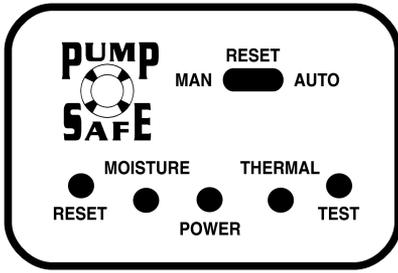
Main cable 1 x AWG 11-7+15-5 Diameter 0.83 inch...0.91 inch  
 Control cable --- Diameter  
 Cable. outer sheath Waterproof synthetic rubber compound  
 Cable length 50 ft (15 m)



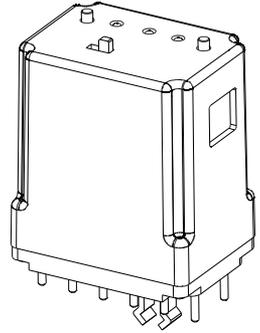
KSB Inc., 4415 Sarellen Road, Richmond, Virginia 23231, Phone: 001-804-222-1818, Fax: 001-804-226-6961  
 KSB Pumps Inc, 5885 Kennedy Road, Mississauga, Ontario L4Z 2G3 (Canada), Phone: (0905) 568-9200, Fax: (0905) 568-9120

KSB Aktiengesellschaft, Turmstrasse 92, 06110 Halle (Germany), Phone +49 (345) 48260, Fax +49 (345) 4826 4699, www.ksb.com

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Monitoring Module



## PumpSafe™ Monitoring Modules for KSB Submersible Pumps

Module Types (by sensor types and pump leads)	
Model	Description
A	Bi-Metal (21 & 22) or PTC Thermistor (10 & 11) and Moisture Sensor (9 & Pump Ground)
B	Bi-Metal (21 & 22) or PTC Thermistor (10 & 11) and Float Switch (3 & 4)
C	Bearing PT-100 (15 & 16) optional (16 & 17) and Moisture Sensor (9 & Pump Ground)
D	Bearing PT-100 (15 & 16) optional (16 & 17) and Float Switch (3 & 4).

### Overview

KSB submersible pump motors have several combinations of over-temperature and moisture intrusion protection. The alternatives employed by KSB are motor specific. Alternatives include bi-metal or thermistors for winding thermal protection, a PT-100 platinum resistance temperature detector for bearing temperature monitoring, and either a conductive sensor electrode or float switch or both for moisture detection. The appropriate module(s) should be specified accordingly.

The four models, designated as A, B, C and D, each incorporate an RS-485 communication bus over which the device broadcasts current status and archival data. Each model is optionally available in a Modbus™ version (-M option) in which the RS-485 bus is used to communicate to a Serial Modbus™ Master.

#### PumpSafe™ Model A

All PumpSafe™ models have two independent channels for monitoring various pump sensors. The Model A monitors Channel 1 and faults when the resistance is sensed to be less than 6K ohms—the value corresponding to moisture having entered the motor housing. Upon falling below this value, an internal timer starts and counts to 15 seconds at which time a counter is advanced by one count. When the counter reaches three, the “Moisture Sensor” LED changes from Green to Amber and the Channel 1 relay toggles indicating an alarm condition. (The counter is reset if no count is received for a 24 hour period.)

If the moisture fault is no longer present the LED continues to flash Amber. This allows maintenance personnel to be aware that an alarm has occurred.

Cycling power to the PumpSafe or pressing the Reset button returns the LED to its Green (normal) condition. (If the fault condition is still present, the Seal Failure alarm will return in 45 seconds.)

**WARNING:** Wait 45 seconds before resuming normal operation.

Channel 0 faults when resistance in the monitored circuit exceeds 4K ohms. This is typically used for monitoring a KSB provided PTC thermistor set or a set of N.C. bimetal switches embedded in the pump motor windings.

When the 4K ohm set point is exceeded, there is a delay of nominally 3 seconds after which the contacts toggle and the LED changes from Green to Red. NOTE: For temperature monitoring, the N.C. contacts are in reality the N.O. relay contacts held closed electrically. This is to provide fail safe operation in the event of a failed or accidentally unplugged PumpSafe module. As a consequence, there is a period of a few milliseconds where the N.O. contact is closed on power-up.

NOTE: On both channels, time delays may appear to vary slightly with sensor resistance due to hardware and digital filtering of the signals.

See “Common Features” for additional information.

### **PumpSafe™ Model B**

Both channels of the Model B are set to fault when the circuit resistance exceeds 4K ohms and therefore behave in the same manner as Channel 0 of the Model A. Typical applications are Channel 0 monitoring a N.C. thermal switch while Channel 1 is monitoring a PTC thermistor. Other N.C. pump sensors such as bi-metallic switches, thermistors or seal chamber float switches can also be monitored.

See “Common Features” for additional information.

### **PumpSafe™ Model C**

The Model C is designed to monitor both a PT100 RTD on Channel 0 and a moisture sensor on Channel 1. Operation of Channel 1 is identical to the Model A. Channel 0 is configured to alarm when the resistance exceeds 157 ohms, corresponding to 150° C with timing and alarm characteristics the same as Model A Channel 0.

See “Common Features” for additional information.

### **PumpSafe™ Model D**

The Model D is also primarily designed for monitoring temperature with Channel 1 configured to alarm when the circuit resistance is greater than 4K ohms, allowing it to monitor either a N.C. thermal switch or a PTC-type thermistor. Channel 0 is configured to monitor a PT100 RTD and is preset for 157 ohms, corresponding to 150°C. Functionally both channels operate in the same manner as Channel 0 of the Model A version.

## Common Features

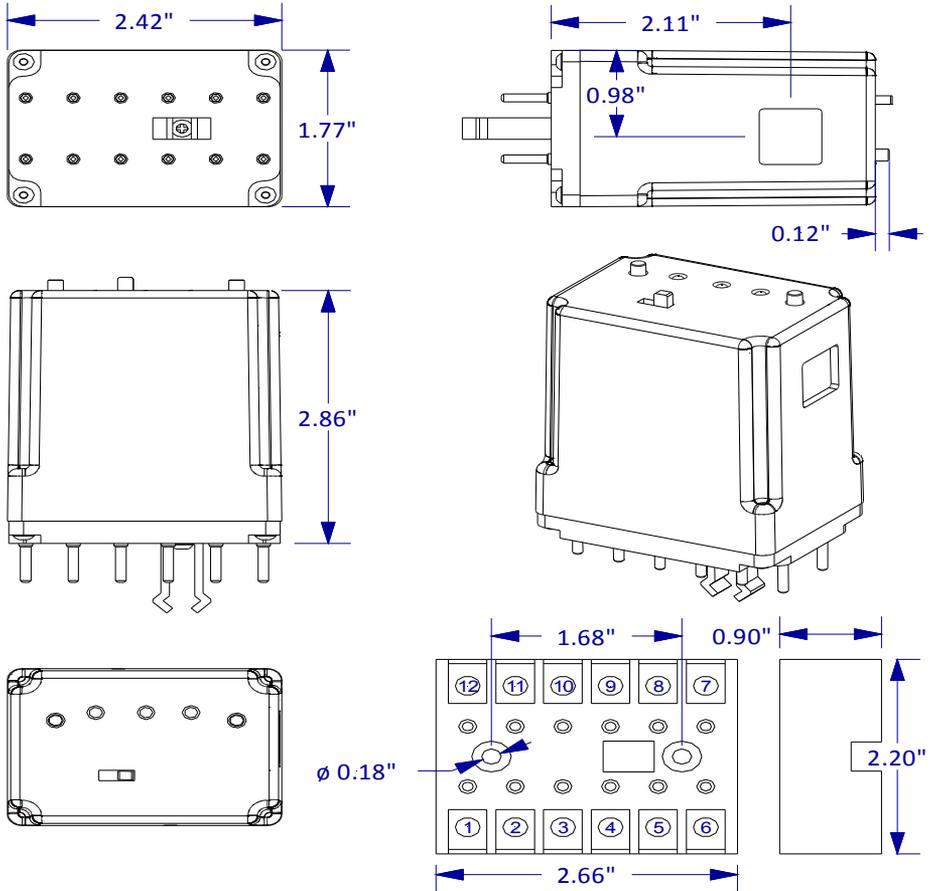
Auto/Manual Reset Switch	Channels that monitor temperature can be set for Manual or Auto reset after experiencing an alarm condition. (Seal failures automatically reset when the alarm condition is removed although the LED continues to flash until reset.) It is recommended that Manual reset be used except in those cases where the control logic “locks out” an automatic restart of the pump.
Reset Push Button	This push button resets the high temperature contacts when the PumpSafe™ is in the Manual Reset mode. It also resets the flashing LEDs that signify that an alarm condition has occurred.
Test Push Button	The Test button simulates an alarm condition in both channels for three seconds or until released. It should be noted that in many cases this will cause the pump to stop because of the simulated high temp condition.
Broadcast Host	All PumpSafe™ relays are provided with a female RJ-11 connector configured as an RS485 port. On standard models, this port is used to broadcast ASCII encoded data for reporting status and archival data to a monitor (laptop computer etc).
Special Configurations	Special configurations are available with short lead-times. Consult the factory for special requirements.

## Technical Data

Operation Principle:	Current sensing		
Environment:	-40 to 55°C (-40 to 131°F)		
Supply Voltage (Nominal):	24 to 240 VAC, 50-60 Hz 24-48 VDC		
Relay Contact Rating:	NEMA B300 Pilot Duty, 1/6th HP, 3A @240VAC; Form C		
Maximum Sensor Voltage:	10 VDC +/- 2%		
Values of Operation:	<b>Alarm Conditions</b>		
	<b>Model</b>	<b>Channel 0</b>	<b>Channel 1</b>
	A	R > 4K ohms	R < 6K ohms
	B	R > 4K ohms	R > 4K ohms
	C	R > 157 ohms	R < 6K ohms
	D	R > 157 ohms	R > 4K ohms
	Green LED On = Supply Voltage present Green LED Off = No Supply Voltage present		
<b>Moisture / Leakage</b>			
Contact:	N.O. contact closes on Alarm condition; N.C. contact used for interlocking when moisture / leakage is a fault condition.		
Reset:	Reset is automatic after removal of alarm condition; however LED continues to blink until Reset button is pushed or power is removed.		
LED Indicators:	Green LED On = No moisture inside motor housing or no liquid inside leakage chamber Amber LED On = Moisture inside motor housing or liquid inside leakage chamber Amber LED Blinking = condition has occurred and has cleared.		
<b>THERMAL (Temperature)</b>			
Contact:	N.O. contact closed on Alarm condition; N.C. contact used for interlocking		
Reset:	<b>Automatic Reset</b> mode. Reset occurs upon closure of thermal switch in stator, however LED continues to flash until power is removed or the Reset button is pressed. <b>Manual Reset</b> mode. High Temperature relay remains "locked out" until power is removed or the Reset button is pressed.		
LED Indicators:	Red LED On = High temperature indication Red LED Off = Normal temperature Red LED Blinking = High temperature has occurred in the past but the condition has been automatically cleared		
<b>Power Consumption</b>	24 VAC - 50/60	1.7 VA	
	120 VAC – 50/60	1.9 VA	
	240 VAC – 50/60	2.4 VA	
	24 VDC	1.4 Watts	

<b>Part Number</b>	PumpSafe Model A PumpSafe Model B PumpSafe Model C PumpSafe Model D Suggested socket – SD12PC or PB12P
<b>Approvals</b>	UL – File E222351

**Mechanical**



## Wiring Diagrams

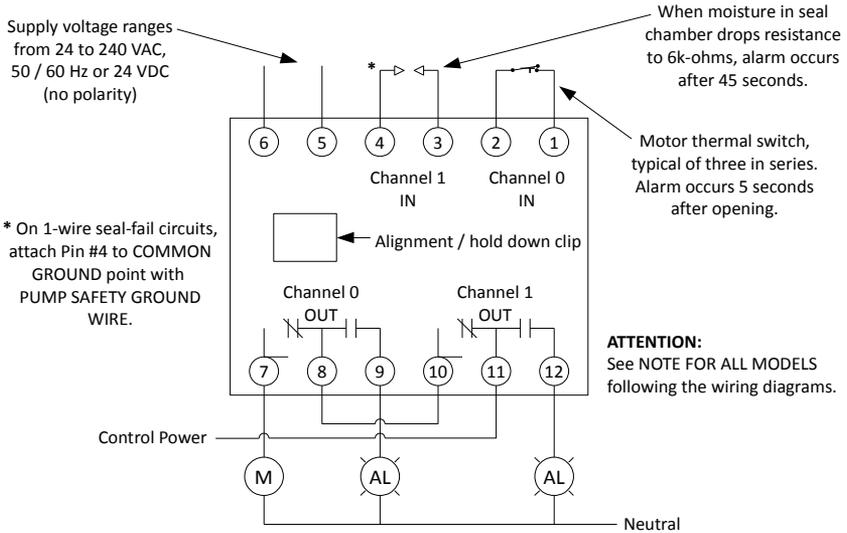


Figure 1. Typical Wiring for Model A PumpSafe When Moisture is a Pump Shut Down Condition

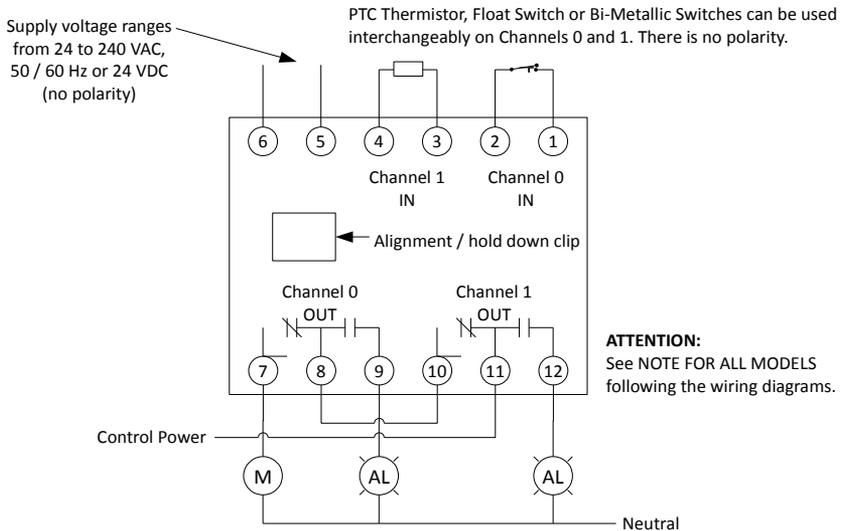


Figure 2. Typical Wiring for Model B PumpSafe When Using a Bi-Metallic Switch and a PTC Thermistor or a PTC Thermistor and a Float Switch

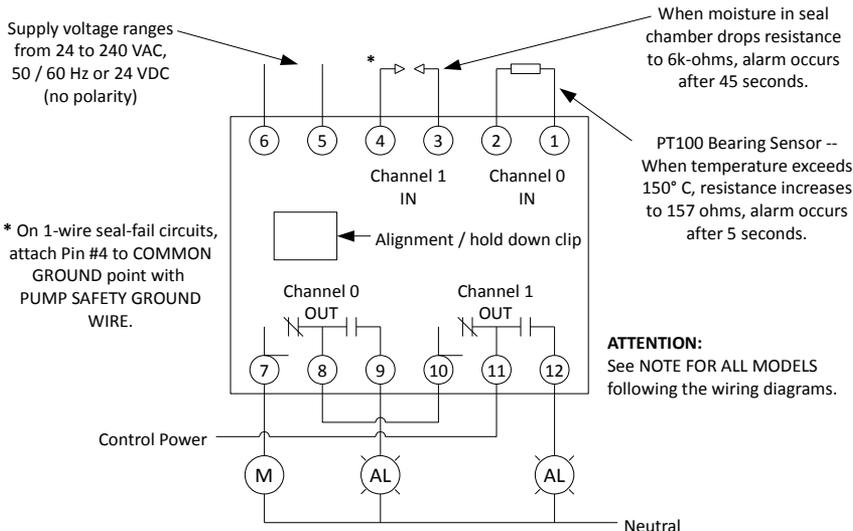


Figure 3. Typical Wiring for Model C PumpSafe When Moisture is a Pump Shut Down Condition and Thermal is a PT100 Bearing Sensor

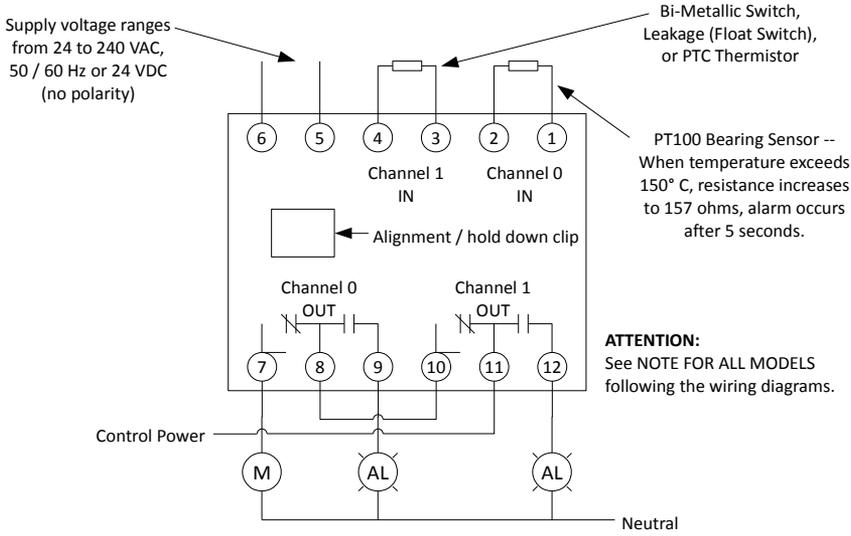


Figure 4. Typical Wiring for Model D PumpSafe With PT100 Bearing Sensor and Bi-Metallic Switch, Leakage (Float Switch), or PTC Thermistor

## NOTE FOR ALL MODELS:

Pins #4 and #2 in **ALL MODELS** are connected internally to the PumpSafe internal Ground. Care must be taken to avoid a grounding conflict. If Broadcast communication is used, then either pin #4 or pin #2 should be connected to panel ground for proper RS-485 signal referencing. In all standard configurations, this would typically be done at pin #4.

\* On 1-wire seal-fail circuits, attach Pin #4 to COMMON GROUND point with PUMP SAFETY GROUND WIRE.

## PumpSafe Broadcast Quick Start Guide

This document applies to PumpSafe firmware revisions 1.13 and higher.

Standard PumpSafe units are furnished with a Broadcast feature which allows a host computer to monitor internal activities over an RS-485 connection.

### PumpSafe RS-485 Hardware Connection

The PumpSafe™ uses an RS-485 communication bus. The standard bus protocol is 19,200 baud, 8 data bits, NO parity, and one stop bit (19.2k,8,N,1).

RS-485 requires three wires -- RS485+, RS485-, and Ground. The PumpSafe™ uses an RJ-11, six-wire connection to bring these signals out. Illustration 1 illustrates the connections from the **cable** perspective.

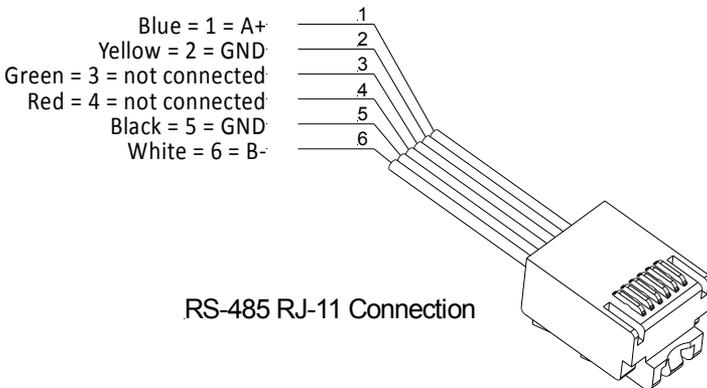


Illustration 1: RJ-11 Connector Pinout

RS-485 specifies line termination requirements, but in practice at 19.2k baud termination is generally not required for distances less than 300 m (1500 ft.). The PumpSafe™ does not incorporate internal termination.

### RS-485 Grounding

The PumpSafe references its internal Ground signal to pins #2 and #4 on the relay base. It is recommended that either pin #2 or pin #4 be referenced to chassis or panel ground. **NOTE: In the case of a one-wire moisture probe, pin #4 is typically connected to panel ground.** In isolated two-wire sensor configurations, either pin #2 or pin #4 should be connected to panel ground. Devices on the RS-485 bus must reference this same panel ground or be guaranteed to stay within a maximum of  $\pm 7$  volts of panel ground for proper operation. Ground voltages outside of this range will produce unpredictable results and may result in hardware damage.

In practice, all devices on the RS-485 bus should tie their zero volt potential to the panel ground. In this case only pins #1 and #6 on the RJ-11 connector are required. If a device is floating on the bus, then pins #2 and #5 may be used to pull that device to the panel ground. These pins are common with the PumpSafe internal Ground signal.

If the RS-485 bus is transmitted over long distances, then the engineer must ensure that either the remote device is guaranteed to stay within the allowed ground potential range or an isolated RS-485 repeater must be installed. Devices are commercially available. In all cases, ***proper care should be taken to avoid grounding conflicts and ground loops.***

### **Broadcasting Operation**

Each second the PumpSafe™ sends a single ASCII string out the RS-485 bus. During transmission the Green Power On LED on the PumpSafe™ will momentarily blink OFF. This is a visual indication the unit is broadcasting.

### **Message Format**

The broadcast message ASCII encoded and readable on any terminal emulation program. Microsoft Windows HyperTerminal is an example.

A message packet consists of nine fields each consisting of a two-letter identifier and a value separated by a delimiter character (':'). The fields are also separated by the delimiter character (':').

All values are transmitted as ASCII encoded decimal values and are 16-bit unsigned integers in the range (0..65,535).

<b>Field</b>	<b>Summary Description</b>
FR	Firmware Revision Level
CF	Factory Configuration Type
A0	Analog Signal -- Channel #0
A1	Analog Signal -- Channel #1
SF	Status Flags Register
F0	Channel #0 Fault Counter
F1	Channel #1 Fault Counter
RL	Reset Counter (Lower 16-bits)
RH	Reset Counter (Upper 16-bits)

*Table 1: Broadcast Message Fields*

### **Firmware Revision Level**

The PumpSafe™ firmware revision level is encoded in a decimal format. For example 109 corresponds to revision level 1.09. The most recent revision level is 1.11 (value=111).

### **Factory Configuration Type**

Each PumpSafe™ model is assigned a unique factory configuration type. This value is broadcast for field reference.

### **Analog Signal -- Channel #0**

The raw analog voltage signal on Channel #0 (**temperature**) may be read. Interpreting this signal requires some underlying knowledge of the PumpSafe™ internal circuitry. In general, this information is not needed, but may be useful in specific troubleshooting circumstances. Consult the factory for details.

## Analog Signal -- Channel #1

The raw analog voltage signal on Channel #1 (**Moisture/Leakage**) may be read. Interpreting this signal requires some underlying knowledge of the PumpSafe™ internal circuitry. In general, this information is not needed, but may be useful in specific troubleshooting circumstances. Consult the factory for details.

## Status Register Flags

This Status Register Flags uses bit encoding to track various states internally within the PumpSafe™. A few of these may be used to decode the present state.

**Note that the information in this register is encoded in individual bits, so the user must either use bit specific commands to interpret the data or use bit-wise AND operations to mask off the unused bits.**

Bits are labeled 0 to 15 from least significant to most significant order. That is bit #0 corresponds to 1 while bit #15 corresponds to 32,768 (decimal).

If bit #4 is 1 then the PumpSafe™ is currently sensing a channel #0 fault condition. Typically this is used in the various models for signaling an **over-temperature** condition. If bit #4 is 0 then no fault is present.

If bit #5 is 1 then the PumpSafe™ is currently sensing a channel #1 fault condition. Typically this is used in the various models for signaling a **Moisture / Leakage** condition. If bit #5 is 0 then no fault is present.

If bit #13 is set then the Auto/Manual switch is set in the Auto position. Manual is indicated by a zero in bit #13.

*Example: Using C language operators, if the Status Register Flags & (1<<4) == 1, then the PumpSafe™ is in an over-temperature fault condition.*

## Channel #0 Fault Counters

Every time the PumpSafe™ senses a fault on channel #0 (**temperature**), the fault counter is incremented by one. This counter is non-volatile and persists for the life of the product. This may be used to track an excessive number of faults in a specific installation.

## Channel #1 Fault Counters

Every time the PumpSafe™ senses a fault on channel #1 (**Moisture / Leakage**), the fault counter is incremented by one. This counter is non-volatile and persists for the life of the product. This may be used to track an excessive number of faults in a specific installation.

## Reset Counters

Every time the PumpSafe™ experiences a power-up from a cold start or a Manual Reset using the reset switch on the device, an internal counter tracks this reset condition. Internally this is a 32-bit counter. The lower 16-bits of this counter are presented in the field RL. The upper 16-bits are presented in the field RH. This value may be used to detect an excessive number of power failures.

**Case Marking / Model Identification**



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UL FILE NO. E222351

**PumpSafe™ Module**

- A    B    C    D  
 MODBUS

Cases are marked with the appropriate Model (A, B, C, or D) and the communication option. If MODBUS is not marked then the default option is Broadcast.



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