SPEARMAN ENTERPRISES

CAMPBELL RIVER, B.C.
PHONE/FAX (250) 923-1288
www.spearmanmarine.com

Spearman Model 413 Bilge Pump Power & Control Hub Installation

Preparation:

Locate or install a power circuit originating as close to the DC battery bank as possible. This circuit should use a round conductor sized so as to be capable of carrying the full load current of the bilge pump as specified by the manufacturer. It should be capable of supplying the pump at not greater than 3% voltage drop at full load, (measured at the pump). It should be equipped with a fuse or circuit breaker at the power source in accordance with ABYC, TP127 or 1332, or other applicable standard. Please see wire and cable notes and recommendations on page 7 of this document.

Make sure that the factory installed ATO fuse (15A for 12V, 7.5A for 24V), Fig 1, is the value recommended for your bilge pump by the manufacturer. If it isn't, replace it with the correct value of ATO fuse. Note that the fuse or breaker installed at the power supply is to protect the power circuit, while the fuse inside the 413 Hub is to protect the bilge pump from overload damage due to jamming of the impeller or other cause. Thus, the power fuse or breaker should be sized at a value ≥ the value of the fuse installed in the 413 Hub, but not at a value which exceeds the rated ampacity of the power cable used.

413 Hub Location and Orientation:

The Spearman 413 can be mounted in any orientation, provided that it is placed close enough to the bilge pump and float switches (or other level sensors) to allow 4½" of free wire length inside the enclosure.

Figure 1

Mounting the 413 Hub

After removing the 413 Hub from its shipping box, remove the cover by loosening the 4 captive screws using a No. 2 Phillips screwdriver.

The holes that receive the cover screws continue through the bottom of the enclosure (Fig. 2) so that four No. 8 pan head sheet metal screws can be used to mount the enclosure. If fastening to wood, the screws can be driven without use of a pilot hole. Note that the heads of the screws will rest ½" away from the back surface of the enclosure. If mounting onto ¾" plywood, for example, the screws can be up to 1¼" before breaking the surface behind.

If mounting onto a metal or fiberglass surface, please use the full size template provided to precisely lay out the location of 4 holes to receive 8-32 machine screws or No. 8 self tapping screws. (Drill size for 8-32 thread is No 29).

If preferred, an adapter kit, QEMFK, is available from Spearman to provide mounting feet outside the perimeter of the enclosure (Fig. 3).

Figure 2
Internal Fastener Mounting

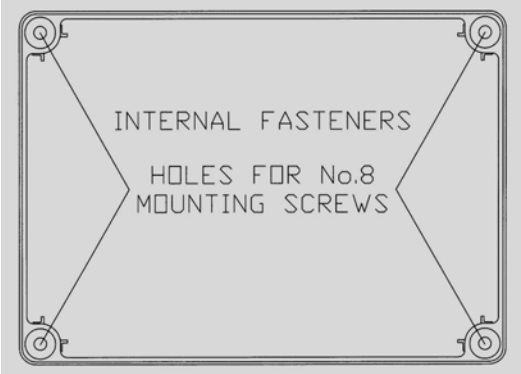
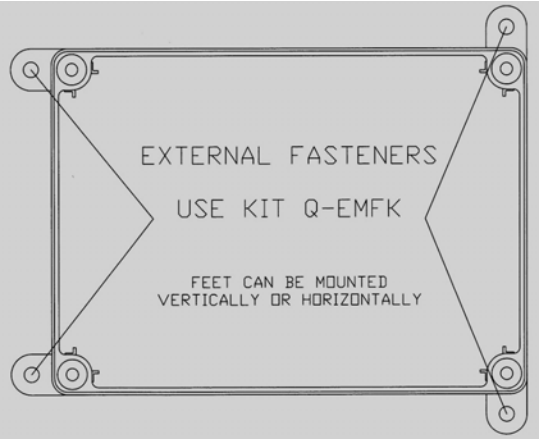


Figure 3
External Fastener Mounting



Wiring the 413 Hub

General:

The oil, water and dust tight integrity of the Spearman 413 Hub rests on the quality of the seal between the cable gland and the wire or cable passing through it. Since the cable glands are designed for use with round cable, it is imperative that round cables are used. Flat cable will not seal.

As the 413 Hub comes out of the box, please note that some of the cable glands (Alarm Out, Remote, & Alarm Float Switch) contain inserts that will maintain watertight integrity of unused cable lands. See Fig. 4.

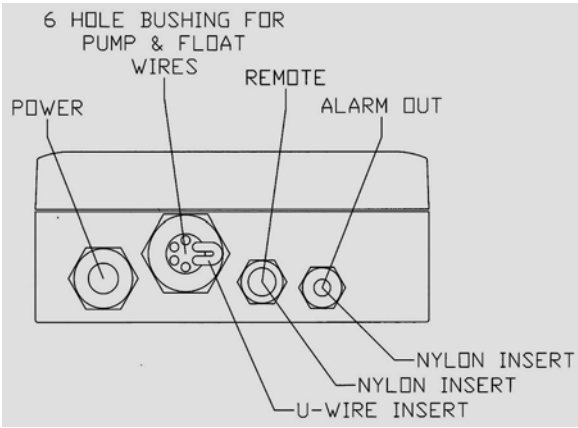
Before starting the wiring, be sure the terminal block cages (wire entries) are fully open. To do this, rotate the screws on top of the terminal blocks counter clockwise until you hear a slight click.

For ease of wire handling within the 413 Hub enclosure, it is strongly recommended that wiring proceeds in this order:

Remote Control, if fitted
Alarm Out, if fitted
Alarm Float Switch, if fitted
Pump Float switch
Bilge Pump
Power

Only use the cable gland assigned for a particular wire or cable as shown in Fig. 4 and 5.

Figure 4
Cable Gland Assignments



Remote control:

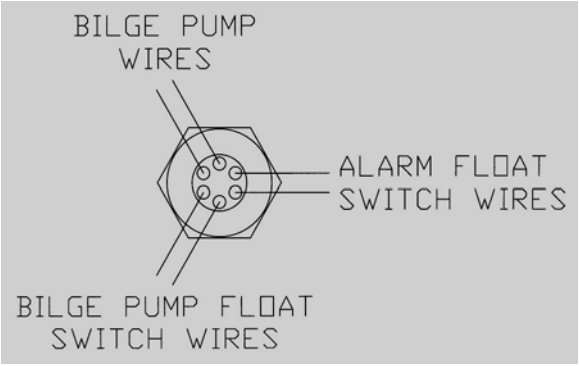
Remove the insert from the cable gland and discard.
Using the 2mm screwdriver provided with the remote control, make sure all of the cages in the remote terminal block are fully open (rotate screws counter clockwise until you hear a slight click).

Insert the remote control cable into its cable gland. Strip the cable jacket 6” and align the cut end of the jacket with the top of the gland. Tighten the gland nut so that the cable is held securely in the cable gland. Strip each conductor ¼” and insert into its terminal position. Tighten the cage screw and pull slightly on the wire to be sure it is properly secure.

Alarm Out:

Remove the insert from the cable gland and discard.
Insert the Alarm Out cable into its cable gland. Strip the cable jacket 6” and align the suit end of the jacket with the top of the gland. Tighten the gland nut so that the cable is held securely in the gland. Strip each conductor 5/16” and insert into the Alarm Out terminal block. It does not matter which wire is top and which is bottom as long as they are installed in the 2 lower positions on the alarm terminal block.

Figure 5
Six Hole Cable Gland:



Alarm Float Switch:

Remove the wire loop insert from the cable gland and discard.
Insert one Alarm Float Switch wire through each of the two holes on the right hand side of the 6 hole bushing as shown in Fig. 6. Pull through 3¼” of wire (from the top of the bushing) and strip the wire 5/16” for entry into the Alarm Float Switch terminal block. Insert the wires into the top two positions on the Alarm Float Switch terminal block. It does not matter which wire is top and which is bottom as long as they are installed in the 2 upper positions on the Alarm Float Switch terminal block.

Bilge Pump Float Switch:

Insert the 2 Bilge Pump Float Switch wires into the holes clockwise from the Alarm float wires. Allow 3¼” of free length above the top of the 6 hole bushing. Strip each wire 5/16” and insert into the Pump Float Switch terminal block. It does not matter which wire

is top and which is bottom as long as one wire is installed in each of the positions in the Bilge Pump Float Switch terminal block.

Bilge Pump:

Insert the two bilge pump wires through the remaining holes in the 6 hole bushing so that 4½" is above the top of the cable gland. Strip the wires 3/8". Note the polarity of the wires. Connect the positive wire into the lower position of the Bilge Pump terminal block marked "POS". Connect the negative wire into the upper position of the Bilge Pump terminal block marked "NEG".

Power:

Remove 6 ½" of the power cable's outer jacket. Cut the filler cords flush with the cut end of the jacket, and install the cable through the power cable gland so that the cut end of the cable jacket is flush with the top of the gland inside the enclosure. Connect the positive wire to the lower position on the Power terminal block marked "POS" and connect the negative power wire to the upper position marked "NEG".

When all of the wires are properly located in the 6 hole bushing, tighten the gland nut so that all of the wires are held securely in the gland.

****

When the wiring is complete, it should appear very similar to the example of Fig.1. The intent is that those wires associated with service items (bile pump and float switches) are installed toward the front of the enclosure, making for easy replacement without disturbing any of the other wiring in the enclosure.

At this point, the bilge pump and float switch (or other type of Level Sensor) wires outside the 413 Hub should be tie wrapped and secured from rotating shafts or other hazards. Tie wraps should be snug enough to hold the wire, but not so tight as to prevent removal of individual pairs from the bundle as may be required to change pumps or switches.

Tie wraps are neither necessary nor recommended inside the 413 Hub enclosure.

Final Checks:

Check each connection to be sure it is in the right place and that all terminal block screws are tight.

Check that each gland nut is tight and the associated wire or cable is held securely in the gland.

Verify that the value of the ATO fuse installed on the circuit board is the correct value for the particular pump you are using.

Replace the cover.

****

Testing:

If a Remote is fitted, select the AUTO position on the mode switch.

Turn the bilge pump circuit on. Nothing should happen.

Lift the pump float switch. The pump should run until the float switch is released, then it should stop. If no remote is fitted, the installation is complete.

If a remote is fitted, move the mode switch to the right. The green LED should illuminate. Release the mode switch. The green LED should extinguish and the mode switch should return to the center, or AUTO, position.

Move the switch to the left, or OFF position. The red LED should illuminate.
Leave the mode switch in the OFF position and lift the pump float switch. The pump should not operate.

Return the remote mode switch to the AUTO position. The red LED should extinguish.

The 413 Hub is now ready to go into service.

****

Notes:

Suitable wire and cable:

All wire and cable should be rated 105°C, FT4
Stranded cable is required. Tinned strands are desirable, but not mandatory.
Spearman does not recommend tinning of stripped conductors, but care must be taken to make sure all strands are inserted into the terminals on the circuit board.

Power:

The Spearman 413 can receive up to 10AWG 2 conductor cable with maximum jacket diameter of 0.512” (13mm)

Any IEEE 45 or 1580 shipboard or rig cable such as Polyrad, Shawflex, Munroe, etc., is suitable, as is any UL1426 or equal round boat cable such as Ancor or Cobra.

Remote:

The 413 Hub was designed for Alpha 5066C, 6 conductor 18AWG cable, which is the recommended and preferred choice. This cable is available from Spearman or your Spearman dealer.

Various other cables will work, such as Belden, Olflex, etc. but the conductor colors may not agree with those designated on the circuit board at the terminal block. In this case, assign a color to a number (also designated on the circuit board), record the assignments and keep a copy of the record both in the 413 Hub enclosure and at the Remote. When all is said and done, the connections at the hub MUST agree at the Remote.

In some cases, a 6 conductor cable may not be readily available, in which case a 7 conductor cable may be used. In this case, cut the unused conductor flush with the top of the strain relief. The maximum diameter the remote cable can be is 0.354” (9mm).

Alarm Out:

The alarm that you have should give a wire and cable specification in its manual. Failing this, Spearman can provide 3 conductor 18AWG shielded Type CMG cable.
This cable provides a round form for the cable gland. If this cable is used, cut the shield, the drain wire, and the unused conductor flush with the jacket. The maximum diameter for the Alarm Out cable is 0.276” (7mm).