

# INSTALLATION INSTRUCTIONS

## GRUNDFOS MAGNA 3 VARIABLE SPEED PUMP WITH LOCHINVAR BOILERS FOR KNIGHTXL, FTXL, CREST, LECTRUS, AND CREST HELLCAT

### Installation and Setup Procedure

1. Refer to the installation manual provided by the pump manufacturer to install the pump. **NOTE:** The boiler **MUST** be installed in the Primary / Secondary piping configuration. A system supply sensor **MUST** be installed in the Primary (building) loop. Refer to the installation and operation manual provided by the boiler manufacturer to ensure the proper system piping configuration.
2. Reference FIG. 1 to connect wiring to the boiler's low voltage control board on the "Boiler Pump Out" terminal:
  - a) Connect the (+) wire from the boiler to "In" connection on the pump 0-10V wiring terminal.
  - b) Connect the (-) wire from the boiler to the ground terminal on the pump 0-10V wiring terminal.
3. Connect line voltage by supplying it directly to the pump.

**NOTE:** This pump is not powered by the boiler. It will have its own dedicated breaker and power supply.

**For Knight and FTXL Models:** Wire the boiler pump dry contacts located on the boiler's line voltage terminal directly to the Magna 3 start/stop connection.

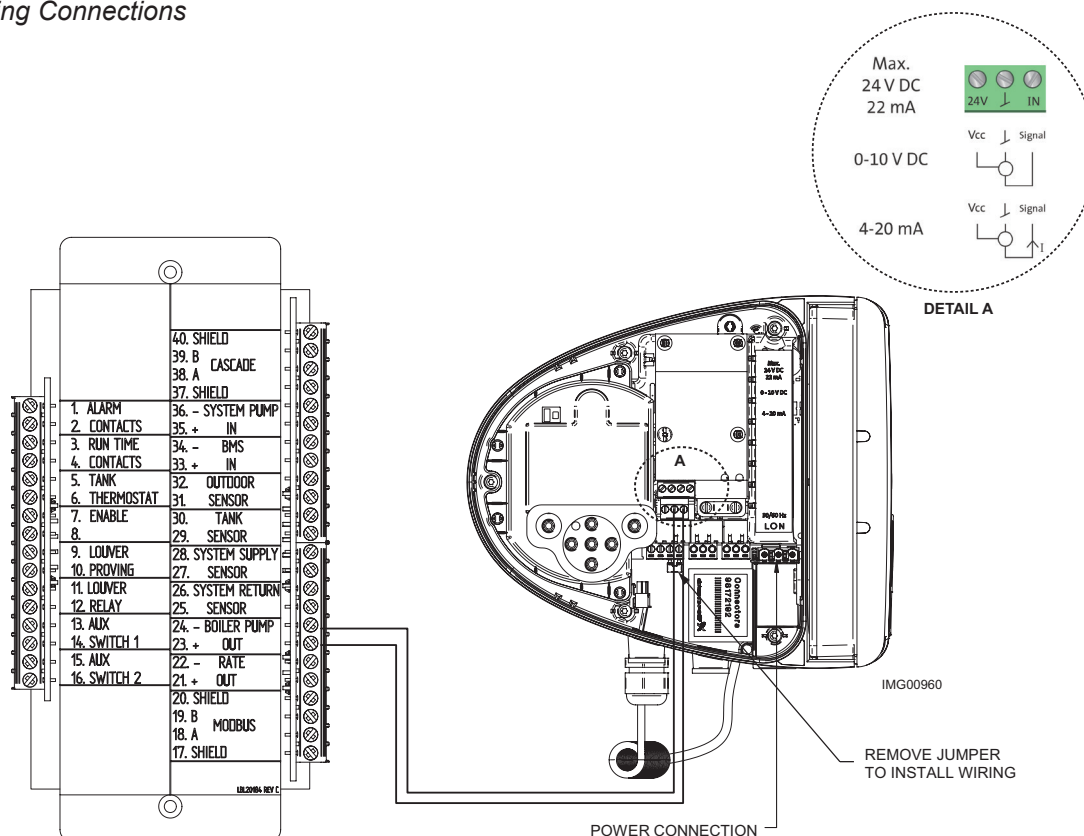
**For Crest and Lectrus Models:** Wire a relay to the 115V boiler pump connections on the boiler's line voltage terminal. Connect the relay to the Magna 3 start/stop connection.

**NOTE:** The Magna 3 start/stop terminals have a small jumper installed. To install the wiring you must remove the jumper.

This method of line voltage supply allows the Pump screen to stay on even when the boiler is in Standby mode. For additional information always reference the "Wiring" section in the boiler installation and operation manual.

4. Reference Tables 1A, 1B, 1C, 1D, and 1E on this instruction sheet to determine the setpoint percentage of the pump.
5. Follow the procedure below to apply the pump setpoint:
  - a) From the pump Home screen use the arrow keys to select [Setpoint].
  - b) Select [OK] to go to the Setpoint screen.
  - c) Use the arrow keys to assign a setpoint based on the information provided in FIG. 2, on page 3.
  - d) Select [OK] to save the setting.
  - e) Select the [Home] button to return to the Home screen.
6. The pump is pre-programmed for 0-10V operation, but the boiler will require setup to control the variable speed pump. Follow the instructions for variable speed pump setup in the boiler installation manual.

**Figure 1 Wiring Connections**



| TABLE 1A - KNIGHT XL TEMPERATURE RISE APPLICATIONS |      |         |              |      |         |              |
|----------------------------------------------------|------|---------|--------------|------|---------|--------------|
| Model                                              | 20°F |         |              | 25°F |         |              |
|                                                    | GPM  | Magna 3 | Setpoint (%) | GPM  | Magna 3 | Setpoint (%) |
| 400                                                | 37   | 40-80   | 92%          | 30   | 40-80   | 75%          |
| 501                                                | 46   | 50-150  | 42%          | 37   | 50-150  | 83%          |
| 601                                                | 55   | 50-150  | 79%          | 44   | 50-150  | 67%          |
| 701                                                | 65   | 50-150  | 79%          | 52   | 50-150  | 64%          |
| 801                                                | 74   | 50-150  | 100%         | 60   | 50-150  | 69%          |

| TABLE 1B - FTXL TEMPERATURE RISE APPLICATIONS |      |         |              |      |         |              |      |         |              |
|-----------------------------------------------|------|---------|--------------|------|---------|--------------|------|---------|--------------|
| Model                                         | 20°F |         |              | 30°F |         |              | 40°F |         |              |
|                                               | GPM  | Magna 3 | Setpoint (%) | GPM  | Magna 3 | Setpoint (%) | GPM  | Magna 3 | Setpoint (%) |
| 400                                           | 38   | 40-80   | 54%          | N/A  |         |              | N/A  |         |              |
| 500                                           | 48   | 40-80   | 68%          | 32   | 40-80   | 45%          |      |         |              |
| 600                                           | 57   | 40-80   | 79%          | 38   | 40-80   | 53%          | 29   | 32-60   | 64%          |
| 725                                           | 69   | 40-80   | 88%          | 46   | 40-80   | 60%          | 34   | 40-80   | 46%          |
| 850                                           | 81   | 50-150  | 50%          | 55   | 40-80   | 70%          | 40   | 40-80   | 53%          |
| 1000                                          | 98   | 50-150  | 48%          | 65   | 40-80   | 67%          | 49   | 40-80   | 56%          |

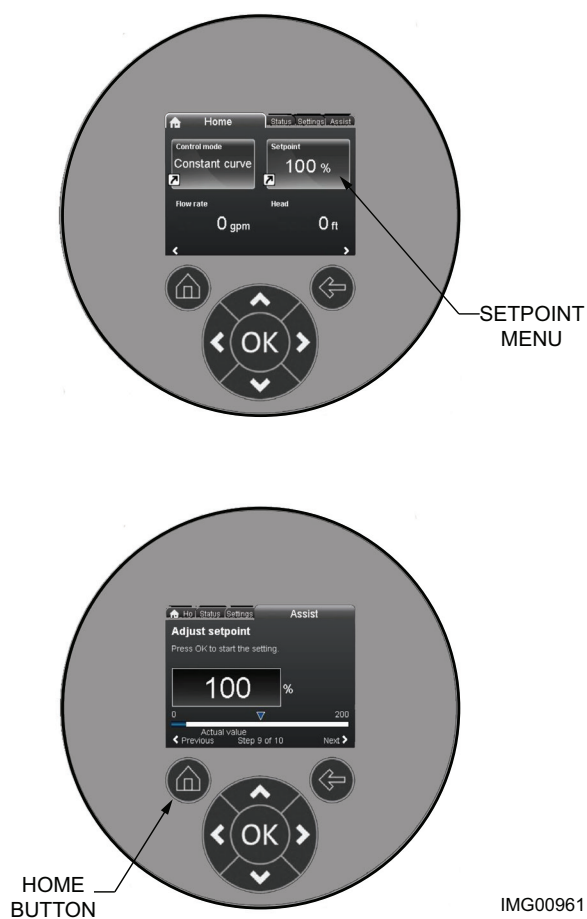
| TABLE 1C - CREST & CREST HELLCAT TEMPERATURE RISE APPLICATIONS |                        |               |       |         |          |      |       |         |          |      |       |         |          |
|----------------------------------------------------------------|------------------------|---------------|-------|---------|----------|------|-------|---------|----------|------|-------|---------|----------|
| Model                                                          | Boiler Connection Size | 20°F          |       |         |          | 40°F |       |         |          | 60°F |       |         |          |
|                                                                |                        | GPM           | FT/HD | Magna 3 | Setpoint | GPM  | FT/HD | Magna 3 | Setpoint | GPM  | FT/HD | Magna 3 | Setpoint |
| 751                                                            | 3"                     | 72            | 6.1   | 50-150  | 44%      | 48*  | 3.6   | 40-80   | 55%      | N/A  |       |         |          |
| 1000 / 1001                                                    | 3"                     | 96            | 10.5  | 50-150  | 58%      | 48   | 6.6   | 40-80   | 63%      |      |       |         |          |
| 1251                                                           | 3"                     | 120           | 12.6  | 50-150  | 67%      | 60   | 6.9   | 40-80   | 71%      | 40   | 4.5   | 40-80   | 52%      |
| 1500 / 1501                                                    | 4"                     | 144           | 13.5  | 50-150  | 72%      | 72   | 7.7   | 40-80   | 81%      | 48   | 6.0   | 40-80   | 62%      |
| 1751                                                           | 4"                     | 168           | 15.4  | 80-100  | 82%      | 84   | 8.5   | 50-150  | 51%      | 56   | 6.9   | 40-80   | 69%      |
| 2000 / 2001                                                    | 4"                     | 192           | 16.6  | 80-100  | 89%      | 96   | 8.7   | 50-150  | 55%      | 64   | 6.9   | 40-80   | 74%      |
| 2500 / 2501                                                    | 4"                     | 240           | 11.4  | 100-120 | 80%      | 120  | 6.2   | 50-150  | 58%      | 80   | 5.1   | 40-80   | 81%      |
| 3000 / 3001                                                    | 4"                     | 288           | 13.0  | 100-120 | 89%      | 144  | 5.2   | 50-150  | 65%      | 96   | 3.8   | 40-80   | 86%      |
| 3501                                                           | 4"                     | 224*          | 12.2  | 100-120 | 78%      | 168  | 6.8   | 50-150  | 72%      | 112  | 4.6   | 50-150  | 53%      |
| 4000 / 4001                                                    | 4"                     | 256*          | 14.0  | 100-120 | 87%      | 192  | 8.1   | 80-100  | 75%      | 128  | 5.4   | 50-150  | 59%      |
| 5000 / 5001                                                    | 6"                     | Not Available |       |         |          | 240  | 7.9   | 80-100  | 86%      | 160  | 5.6   | 80-100  | 62%      |
| 6000 / 6001                                                    | 6"                     |               |       |         |          | 288  | 8.7   | 100-120 | 87%      | 192  | 4.3   | 80-100  | 68%      |

\*Based on 30°F Temperature Rise

| TABLE 1D - KBX TEMPERATURE RISE APPLICATIONS |      |         |              |      |         |              |
|----------------------------------------------|------|---------|--------------|------|---------|--------------|
| Model                                        | 20°F |         |              | 25°F |         |              |
|                                              | GPM  | Magna 3 | Setpoint (%) | GPM  | Magna 3 | Setpoint (%) |
| 400                                          | 38   | 40-80   | 67%          | 30   | 40-80   | 55%          |
| 500                                          | 48   | 40-80   | 80%          | 38   | 40-80   | 72%          |
| 650                                          | 62   | 50-150  | 60%          | 50   | 40-80   | 74%          |
| 800                                          | 76   | 50-150  | 63%          | 61   | 50-150  | 55%          |
| 1000                                         | 96   | 50-150  | 68%          | 76   | 50-150  | 54%          |

| TABLE 1E - LECTRUS TEMPERATURE RISE APPLICATIONS |      |       |         |            |      |       |         |            |      |       |         |            |
|--------------------------------------------------|------|-------|---------|------------|------|-------|---------|------------|------|-------|---------|------------|
| Model                                            | 20°F |       |         |            | 30°F |       |         |            | 40°F |       |         |            |
|                                                  | GPM  | FT/HD | Magna 3 | Setpoint % | GPM  | FT/HD | Magna 3 | Setpoint % | GPM  | FT/HD | Magna 3 | Setpoint % |
| KEB0015                                          | 5.4  | 3.3   | 32-60   | 41%        | 3.3  | 3.6   | 32-60   | 42%        | 2.4  | 3.6   | 32-60   | 42%        |
| KEB0030                                          | 11.0 | 3.4   | 32-60   | 43%        | 7.0  | 3.5   | 32-60   | 43%        | 4.7  | 3.6   | 32-60   | 42%        |
| KEB0045                                          | 16.0 | 3.5   | 32-60   | 48%        | 10.8 | 3.5   | 32-60   | 44%        | 7.9  | 3.6   | 32-60   | 43%        |
| KEB0060                                          | 21.9 | 3.7   | 40-80   | 40%        | 14.2 | 3.7   | 32-60   | 47%        | 10.8 | 3.7   | 32-60   | 45%        |
| KEB0075                                          | 27.1 | 3.9   | 40-80   | 44%        | 18.1 | 3.8   | 32-60   | 52%        | 13.1 | 3.8   | 32-60   | 47%        |
| KEB0090                                          | 32.7 | 4.1   | 40-80   | 47%        | 21.0 | 3.9   | 32-60   | 55%        | 16.0 | 3.9   | 32-60   | 50%        |
| KEB0105                                          | 37.0 | 4.3   | 40-80   | 50%        | 25.7 | 4.0   | 32-60   | 62%        | 18.9 | 3.9   | 32-60   | 53%        |
| KEB0120                                          | 41.6 | 4.4   | 40-80   | 53%        | 28.1 | 4.0   | 32-60   | 65%        | 20.8 | 3.8   | 32-60   | 55%        |
| KEB0135                                          | 45.7 | 4.7   | 40-80   | 58%        | 31.1 | 4.2   | 32-60   | 70%        | 23.8 | 4.0   | 32-60   | 59%        |
| KEB0150                                          | 52.0 | 5.1   | 40-80   | 62%        | 35.1 | 4.3   | 32-60   | 76%        | 26.1 | 4.3   | 32-60   | 63%        |

**Figure 2 Pump Setpoint Screens**



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**Revision Notes:** Revision A (ECO C14573) initial release.

Revision B (ECO C14859) reflects the update of Table 1A, Table 1B and other text adjustments.

Revision C (ECO C15375) reflects the addition of FTX Models and Table 1C.

Revision D (ECO C17117) reflects the addition of the system sensor note on page 1, Step 1.

DIR# 2000505834 Rev A (CN# 500000615) creation of TLT DIR in SAP.

Rev B (CN # 500000827) reflects the addition of Crest 751 - 1251 models and update of Tables 1B and 1C.

Revision C (PCP #3000030930 / CN# 500020087) reflects an update to Table 1C.

Revision D (PCP #3000036241 / CN #500024638) reflects an update to the installation of the wiring procedure on page 1.

Revision E (PCP #3000047451 / CN #500035320) reflects the addition of Table 1D - KBX Temperature Rise Applications on page 2.

Revision F (PCP #3000051890 / CN #500038865) reflects addition of the 1000 to table 1B on page 2.

Revision G (PCP #3000057460 / CN #500043669) reflects the addition of the Crest.

Revision H (PCP #3000063036 / CN #500048969) reflects the addition of table 1E.

Revision J (PCP #3000065481 / CN #500051127) reflects updates to table 1E.