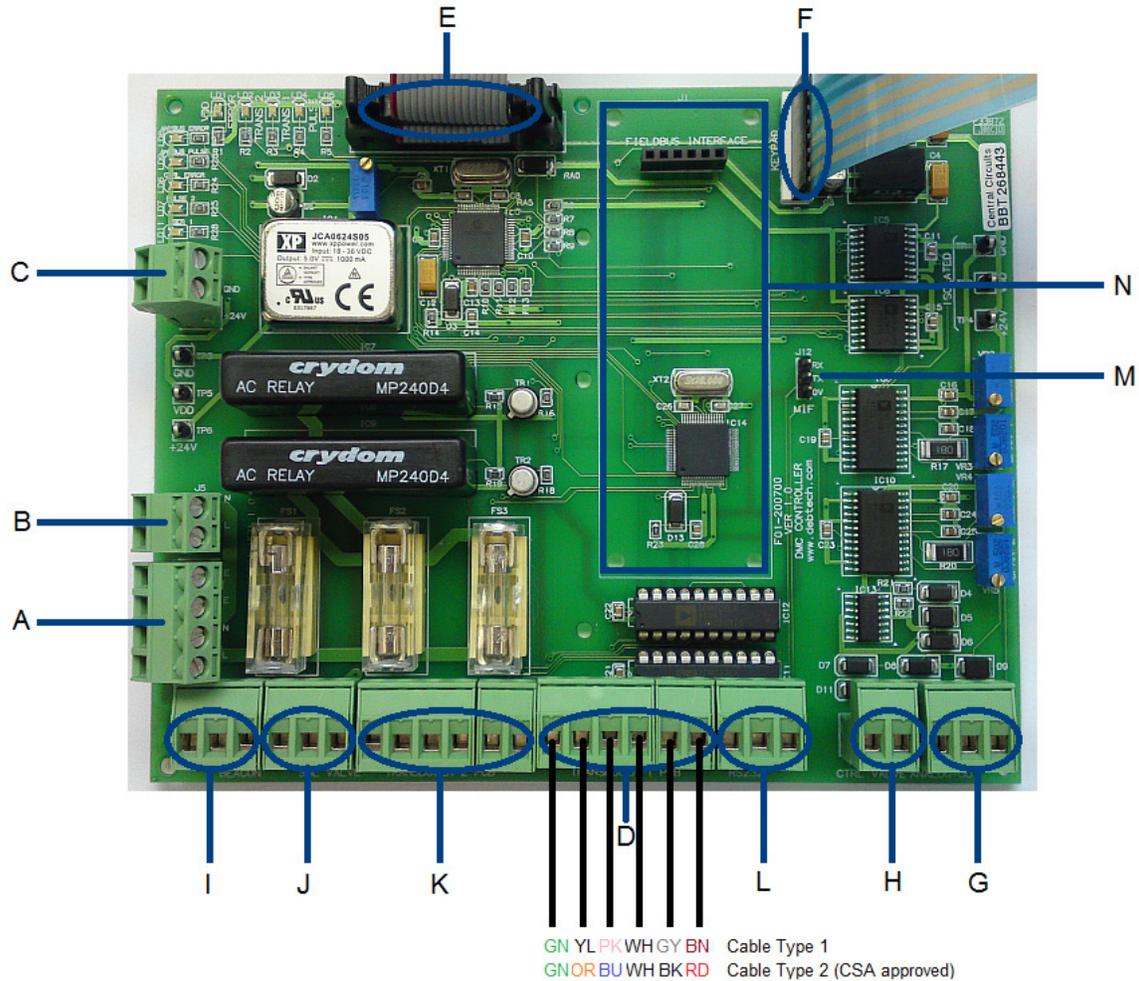


Dense Medium Controller packing slip  
(F01-200000-907 revision 1.3)



...to Transducer (the Transducer PCB is factory pre-wired)

**NOTE:** See the wiring diagram in the DMC Owner's Manual for detailed pin descriptions when connecting.

Connection	Label	Description
A	220V AC IN (J6)	Connect the Mains incoming AC supply (85 – 264VAC) to this connector.
B	220V AC to PSU (J5)	The 24Vdc power supply is powered with AC power via this connector. This connection is factory pre-wired.
C	+24V IN (J4)	24Vdc is supplied from the power supply to the Controller PCB via this connector. This connection is factory pre-wired. If an external 24Vdc supply is preferred, connect it directly to this connector.
D	Transducer 1 PCB (J9)	The Transducer connects to the Controller at this connector. This connection must be made by the end user. Ensure the correct wiring is observed.
E	LCD (J10)	The LCD screen connects at this connector. This connection is factory pre-wired.
F	KEYPAD (J2)	The touchpad connects at this connector. The touchpad connector is not keys so if insertion in one direction does not provide the correct respond on the LCD, rotate the connector and insert again. This connection is factory pre-wired.
G	ANALOG-OUT (J14)	The analog output signal that provides the density value connects here. 4-20mA, 0-20mA, 0-24mA and 0-10Vdc are supported, exclusively.
H	CTRL VALVE (J13)	This is a 4-20mA PID output to a control valve for automatic water addition (to reduce the density).
I	BEACON (J7)	The Alarm beacon connects at this connector. The beacon is supplied with an AC signal when the density is outside a set range. The AC signal magnitude corresponds with the Mains AC Voltage supplied to the DMC Controller.
J	SOL VALVE (J8)	ON/OFF solenoid valve connector for automatic water dilution. The solenoid valve is supplied with an AC signal when the density is above a set value. The AC signal magnitude corresponds with the Mains AC Voltage supplied to the DMC Controller.
K	Transducer 2 PCB (J3)	Reserved for future use.
L	RS232 (J11)	To obtain the density value on a PC, connect an RS232 client to this connector.
M	MIF (J12)	DebTech developer diagnostic connector.
N	FIELDBUS INTERFACE CONNECTOR (J1)	Where selected, a Fieldbus interface PCB plugs in here.

## Getting Started

Once the wiring is complete and the Transducer and Controller are turned on, the DMC needs to be programmatically configured.

There are 4 critical settings to configure the DMC:

1. The **pipe size** must be set. This represents the pipe outer diameter of the Transducer. Set to the transducer size currently connected to the DMC Controller. The label on the side of the Transducer indicates the pipe outer diameter. Valid values are 50mm, 75mm, 110mm, 160mm, 225mm 315mm and 355mm. [MENU\ SETUP\ PIPE SIZE]
2. The **medium type** must be set. This represents the magnetic slurry material expected inside the Transducer. Valid types are Magnetite, Milled FeSi or Atomised FeSi. [MENU\ SETUP\ MEDIUM TYPE]
3. The **output type** must be set. If the installation calls for an analog output setup then this step must be selected. However, if a Fieldbus or Serial output is only needed, then setting up this output type can be ignored. This setting represents the type of analogue output signal the user wants from the Controller. Valid types are 4-20mA, 0-20mA, 4-24mA and 0-10Vdc. [MENU\ SETUP\ ANALOG OUTPUTS\ ANALOG OUTPUT\ OUTPUT OPTIONS]. Only one of the outputs types can be used at any given time.
4. A **Full Calibration** must be completed. The DMC has two calibration options, a **Quick Calibration** and a **Full Calibration**. Although a Quick Calibration can be performed, which utilises default calibration information for quick testing of the DMC, it is necessary for a **Full Calibration** be carried out especially when first commissioning the DMC.

Once the above basis setup is complete, the unit is operational.

## Full Calibration

### Full Calibration Steps:

Case assumption: Plant operates at 1.60 S.G. normally.

1. Ensure the Transducer's electronics temperature (PCB: xx.x°C displayed on Home Screen 2) is within two degrees of the PCB temperature setpoint. [MENU\ SETUP\ VIEW SETTINGS\ PCB SETPOINT xx°C]. If the temperature is too low, wait for the electronics to be heated by the heating plate. This would take a few minutes. The electronics temperature is regulated at this temperature to ensure accurate functioning of the sensitive electronics.

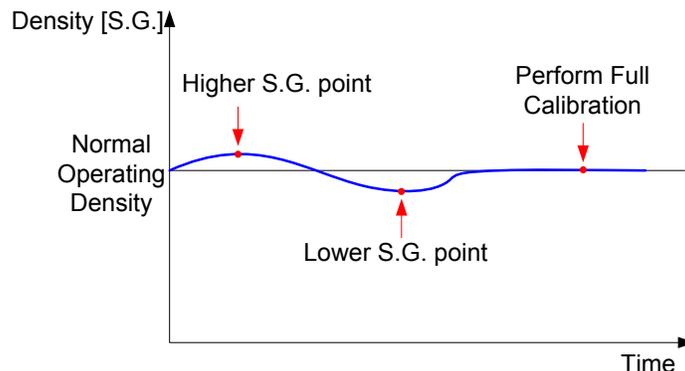


Figure 1. Higher S.G., Lower S.G. and point of Full Calibration.

2. Allow the plant to settle at a density below the normal expected value. In this case, 1.40 S.G. (for example). With the plant steady at this S.G. value, begin to define this value as the lower S.G. [MENU\ CALIBRATE\ FULL CALIBRATION\ DEFINE LOWER S.G.]. While the unit is gathering data as indicated by the percentage complete, take a hand sample of the physical slurry and use a (Marcy/ digital) scale to accurately measure/ confirm the density in S.G. When the Controller reaches 100% calibration, input the actual density as measured with the scale into the Controller. The Lower S.G. point is now defined.
3. Now to define the higher S.G. point, allow the plant to settle at a density above the normal expected value. In this case, 1.80 S.G. (for example). With the plant steady at this S.G. value, begin to define this value as the higher S.G. [MENU\ CALIBRATE\ FULL CALIBRATION\ DEFINE HIGHER S.G.]. While the unit is

gathering data as indicated by the percentage complete, take a hand sample of the physical slurry and use a (Marcy/ digital) scale to accurately measure/ confirm the density. When the Controller reaches 100% calibration, input the actual density as measured with the scale into the Controller. The Higher S.G. point is now defined.

NOTE: The Higher or Lower S.G. point can be done in any sequence, at any time. For example, plant dynamics may mean the higher S.G. can be defined presently and the lower S.G. can only be defined 1 day later. The Controller simply stores the data for the higher and lower points as they are updated and only does the Full Calibration when the user requests it.

4. Once the Higher and Lower S.G. points have been defined, the plant can be adjusted to its normal density, say 1.60 S.G. as in this case. To complete the Full Calibration the DMC must be made to perform a Full Calibration. Note, when a Full Calibration is requested, the Controller works off the data already stored as the Lower and Higher S.G., so ensure they are defined first before performing a Full Calibration. To perform a Full Calibration based on the defined Lower and Higher S.G., select Calibrate. [MENU\ CALIBRATE\ FULL CALIBRATION\ FULL CALIBRATE]. While the unit is calibrating as indicated by the percentage complete, take a final hand sample of the physical slurry and use a (Marcy/ digital) scale to accurately measure the density. When the Controller reaches 100% calibration, input the actual density as measured with the scale into the Controller.

A Full Calibration is now complete and the calibration curve data is updated based on the Lower and Higher S.G. points. This allows for consecutive Quick Calibrations to be performed accurately for this plant.

NOTE: The Controller stores the Higher S.G., Lower S.G. and Calibration data in permanent memory as and when they are defined by the user so that even if power is recycled at any stage the information is not lost.

NOTE: The Higher and Lower S.G. values only take effect when a Full Calibration is completed.

## Quick Calibration

### Quick Calibration Steps:

Case assumption: Plant operates at 1.60 S.G. normally.

1. Ensure the Transducer Electronics Temperature (displayed on Home screen 2) is within two degrees of the PCB temperature set-point. [MENU\ SETUP\ VIEW SETTINGS\ PCB SETPOINT]. If the temperature is too low, wait for the electronics to heat up.
2. Allow the plant to settle at its normal density value. In this case, 1.60 S.G. (for example). Select Quick Calibration. [MENU\ CALIBRATE\ QUICK CALIBRATION].
3. While the unit is calibrating as indicated by the percentage complete, take a hand sample of the physical slurry and use a (Marcy/ digital) scale to measure the density.
4. When the Controller reaches 100% calibration, input the actual density as measured with the scale. A Quick Calibration is now complete. The unit is ready for operation.

**It is recommended that a Quick Calibration be done once a week.**

ERROR NUMBER DISPLAYED	ERROR DESCRIPTION	CORRECTIVE ACTION
1	Incorrect pipe size attempted, reset to default	From the Menu, re-select a valid Pipe Size.
2	RS232 Data receive error or time out	Check wiring between Transducer and Controller. Ensure wiring as per wiring diagram. Transducer error LED flashes 5 times when there is no communication to the Controller. Check this to confirm that the transducer is attempting to communicate with the Controller. Replace Transducer PCB or/ and Controller PCB.
3	Incorrect range selected for Analog Output	From the Menu, re-select a valid Analog Output option.
9	No data received from Transducer (timeout 20s)	Check wiring between Transducer and Controller. Ensure wiring as per wiring diagram. Transducer error LED flashes 5 times when there is no communication to the Controller. Check this to confirm that the transducer is attempting to communicate with the Controller. Replace Transducer PCB or/ and Controller PCB.
12	Incorrect Medium type attempted, reset to default	From the Menu, re-select a valid Medium Type option.
13	Incorrect medium type read from memory	From the Menu, re-select a valid Medium Type option.
14	Incorrect medium type in convert routine, reset to Atomised FeSi range	From the Menu, re-select a valid Medium Type option.
15	Frequency received is less than 100Hz	This confirms that the RS232 communication interface is working between the Transducer and Controller. Replace Transducer PCB. Replace the complete Transducer.
16	Magnetite density above set range	The DMC cannot measure Magnetite densities above its capable range. Recalibrate the unit if the actual density is not above the instruments specified range.
17	Atomize FeSi density above set range	The DMC cannot measure Atomised FeSi densities above its capable range. Recalibrate the unit if the actual density is not above the instruments specified range.
18	Milled FeSi density above set range	The DMC cannot measure Milled FeSi densities above its capable range. Recalibrate the unit if the actual density is not above the instruments specified range.
19	Density below the value 1.000 S.G.	The DMC cannot measure densities below its capable range. Please recalibrate the unit if the actual density is not below 1.000 S.G.
20	The frequency from the Transducer does not yield a valid Density.	Ensure the correct pipe size is set in the DMC Controller Menu, which corresponds with the actual Transducer pipe size. Recalibrate the DMC.
21	Factory defaults have been restored	None.
22	The DMC has been restarted	None.
23	Incorrect fieldbus type read from RAM	Replace the Fieldbus daughter card. Replace the Controller PCB.
24	FIELDBUS: Insufficient data bytes (>0 but <7) received from Anybus chip	Replace the Fieldbus daughter card. Replace the Controller PCB.
25	FIELDBUS: Modbus error code received over Anybus interface	Replace the Fieldbus daughter card. Replace the Controller PCB.
28	FIELDBUS: No data (zero bytes) received from Anybus chip	Replace the Fieldbus daughter card. Replace the Controller PCB.
29	The current coil temperature differs from the coil temperature at the time of Calibration by more than 15 degrees Celsius.	Recalibrate the DMC. The error is caused when the DMC Transducer experiences large swings in temperature due to it being mounted in full sun, for example.