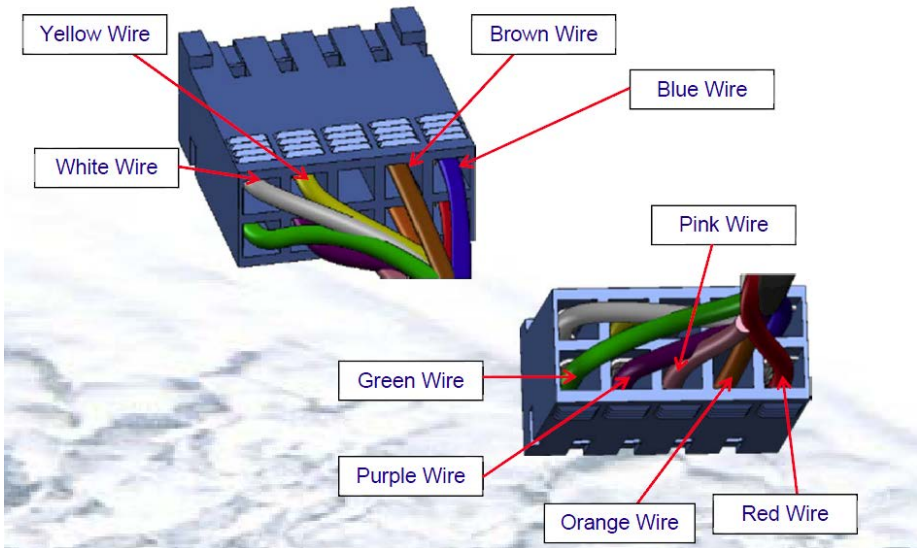
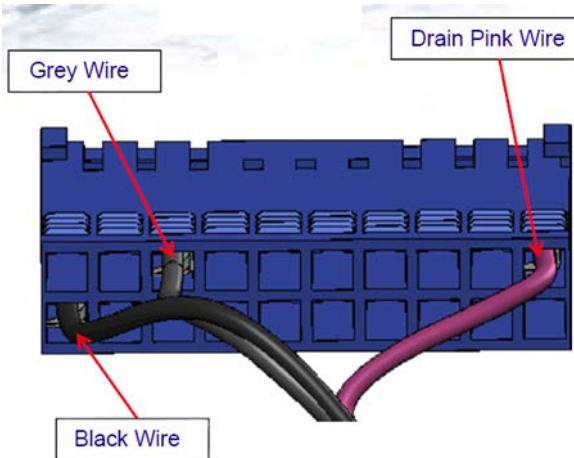
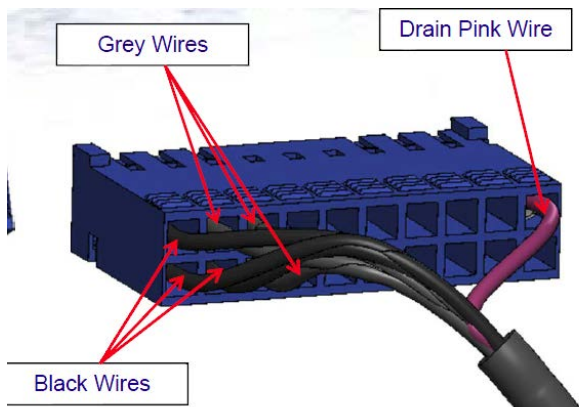


5.6: Functional Tests

Meter can be tested electrically for correct circuit resistance and isolation to ground, either measured via the sensor connector to the MFC400, or in the sensor junction box. This should identify basic meter faults.

Compact device:

For compact devices, carefully remove the sensor electronics to allow access to the measuring points. Circuits can be checked by carefully measuring the resistance through the individual wires.

Sensor/RTD Connection	
	
Driver Connection	
Non-Ex device	Ex device
	

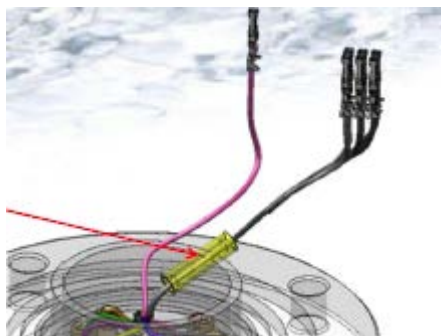
Note:

For non-Ex devices and remote MFC400 housings, only 1 Grey/Black wire is used.

For sensor connector, pink wire is connected to braid shielding.

Orange and Brown wires are connected together internally.

For Ex devices, multiple Grey/Black wires are used, and are connected together internally.



For ease of testing, use a remote-PCB connection board to allow better access.

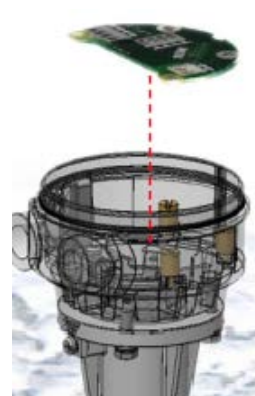
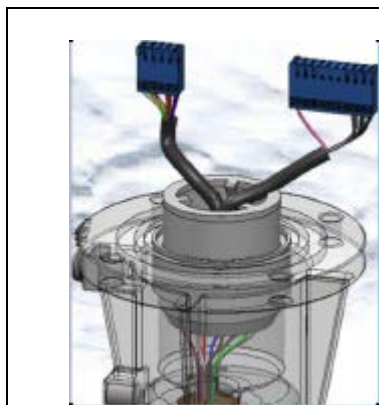
Remote device:

For remote devices, remove the cables in the sensor junction box and check the resistances directly on the remote-PCB.

Note that for complete system check, there are several connection points that may also need investigating in the case of suspected fault, in addition to the supplied cable.

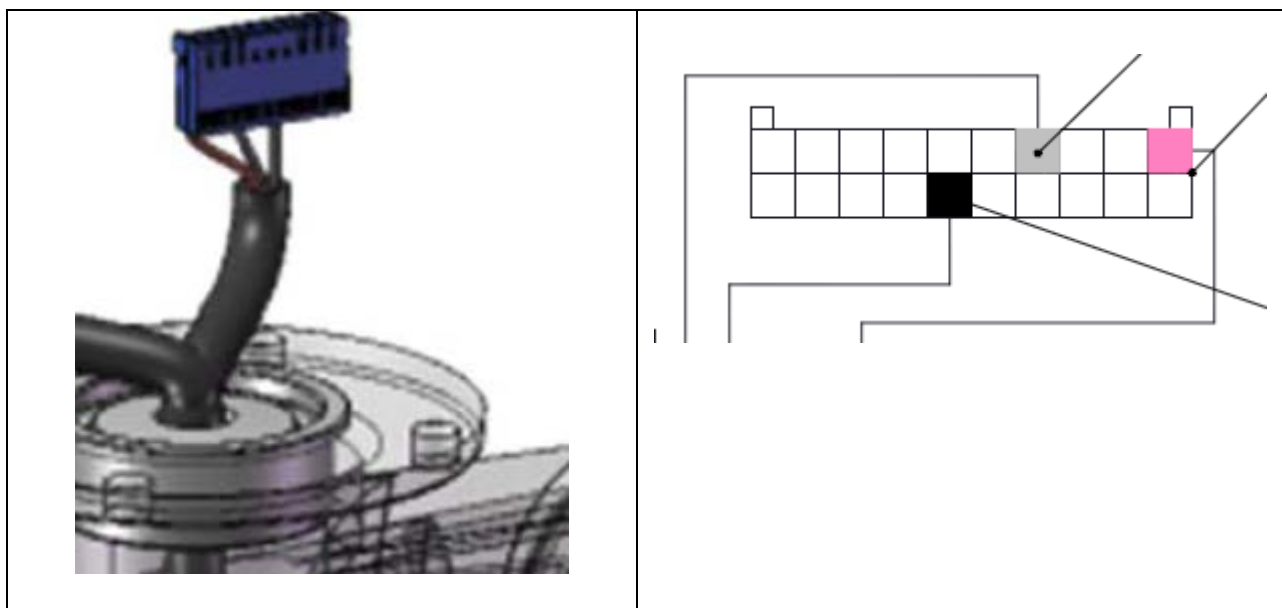
Connection of sensor to remote connection board:

Check the dubox connector on the underside of the remote connection PCB.



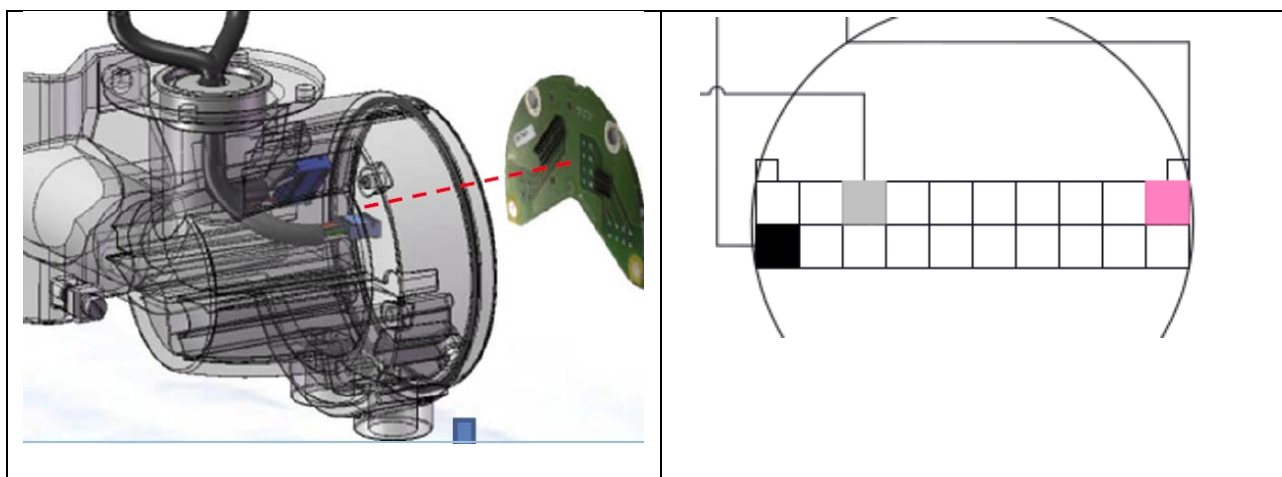
Connection to MFC400 electronics in housing:

Check the dubox connector that connects to the MFC400 electronics. Note that for all Ex meters, and non-Ex meters supplied before January 2018, the positions of the black and grey wires are different to the positions for compact devices, as per below. In case of doubt about the correct position, please check with KLTD.



Connection to console PCB in field housing:

Check the dubox connector that connects to the console PCB. Note that the positions of the black and grey wires are as per compact devices.



Typical driver and sensor resistances at 20°C (+/- 10Ω unless stated or range given):

Typical Values	Resistance (Ohm)				
	Driver		Sensor A – Sensor B		
OPTIMASS 6000	Black/Grey		Purple/Green - White/Yellow		
	Cryo/230°C (+/- 5Ω)	400°C	Cryo/230°C		400°C
			Pre-08/13	Post-08/13	
08	72	12	530	273	49
10	72	12	770	273	49
15	68	6	770	273	49
25	42	13	342	185	22.5
50	42	52	342	185	22.5
80	42	52	443	185	22.5
100	42	54	342	185	22.5
150	42	70	-	185	22.5
200	69	68	-	185	22.5
Note: Resistance values for sensor coils were modified ~ August 2013.					
OPTIMASS 1000	Black/Grey		Purple/Green - White/Yellow		
15	62 ... 74		78 ... 90		
25	62 ... 74		64 ... 72		
40	64 ... 76		78 ... 90		
50	64 ... 76		64 ... 72		
OPTIMASS 2000	Black/Grey		Purple/Green - White/Yellow		
100	29 ... 41		100 ... 110		
150	29 ... 41		84 ... 89		
250	29 ... 41		84 ... 89		
400	41 ... 51		78 ... 90		
OPTIMASS 3000	Black/Grey		Purple/Green - White/Yellow		
01	84 ... 102		105 ... 115		
03	84 ... 102		135 ... 145		
04	84 ... 102		135 ... 145		

OPTIMASS 7000	Black/Grey	Purple/Green - White/Yellow
06	86 ... 96	138 ... 160
10	86 ... 96	138 ... 160
15	68 ... 78	138 ... 160
25	64 ... 74	138 ... 160
40	38 ... 58	138 ... 160
50	38 ... 58	138 ... 160
80	38 ... 58	138 ... 160
Note 1: When checking sensor coil resistance value, it is important that both coils show similar resistances. Note 2: Values are dependent on temperature – values will change significantly for cryogenic and high temperatures		

Typical RTD/Strain resistances:

Typical Values	Resistance (Ohm) @ 20°C		
	PT500	Compensation Links	
	Red-Blue	Red-Brown/Orange	-
OPTIMASS 3000	540Ω	0.1Ω	-
OPTIMASS 6000	540Ω	0.1Ω	-
	PT500	Strain 1	Strain 2
	Red-Blue	Red-Brown	Brown-Orange
OPTIMASS 1000	540Ω	450Ω - 700Ω	-
OPTIMASS 2000	540Ω	450Ω - 700Ω	450Ω - 700Ω
OPTIMASS 7000 – 06/10	540Ω	450Ω - 700Ω	215Ω - 300Ω
OPTIMASS 7000 – 15/25/40/50/80	540Ω	450Ω - 700Ω	-

Circuit Isolations – All meters:

All Sensors, Driver & RTD circuits should be isolated from ground and from each other. Check resistance to case – should be > 20MΩ.

- Meter may be inoperable if circuits are shorting to ground.
- Caution: Conductive fluid may be in outer casing, especially if two or more circuits show path to ground
 - o Possible tube failure due to erosion or corrosion!

Remote terminal – Colour table

Remote terminal	Colour
DR+	Black
DR-	Grey
SA+	Green
SA-	Purple
SB+	White
SB-	Yellow
T1	Orange
T2	Brown
T3	Red
T4	Blue