View

HC106

Load Moment Indicator

Troubleshooting-Repair Manual

6.28.19 TME Rev 9
Software 1.0-1.5A4

CONTROL SYSTEMS
TECHNOLOGY FOR MOBILE MACHINES

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IMPORTANT TROUBLESHOOTING NOTE !

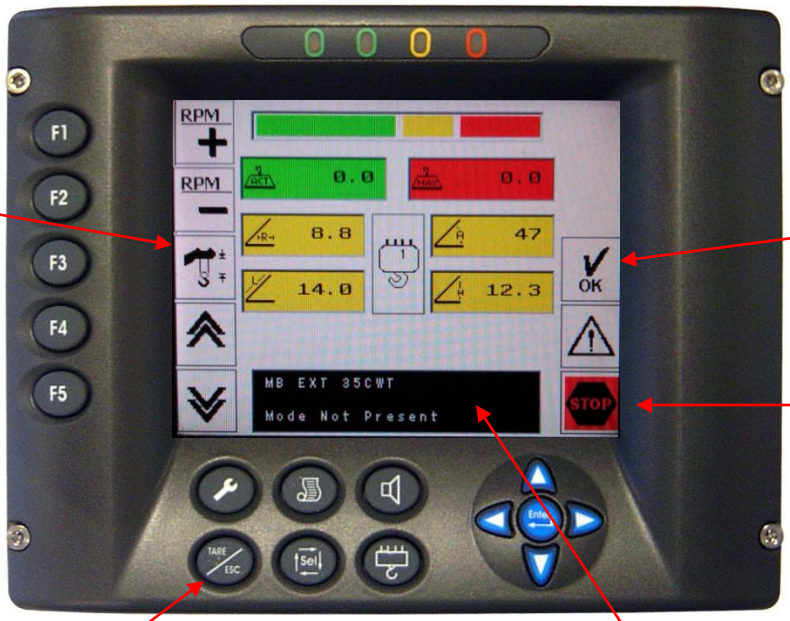
Prior to troubleshooting the View HC system, a simple check of the unit is necessary to avoid extended time. When the system is powered up it performs a self test of all components. During this self test if any components are disconnected or faulty it will indicate alarms in the message area code 6, 12, 13 and 190.

This indicates that components did not pass the self test for communication, which creates the 190 communication code. A simple check is required to see the true faults if any by confirming the system by program, then once the unit has cleared and alarm codes are present press and release the Tare/ESC pushbutton on the display. The system will clear all non-faulted alarm code and display the faulted components codes only.

Low Fuel Level; The unit is equipped to indicate a Low fuel level text message on the display when the fuel level is at 12% or lower.

View

The View system will store and indicate the alarm code on the display. First we should press and release the TARE/ESC pushbutton to clear any stored alarms. If more than one alarm is stored it will clear the first, then display the next one. To clear this press and release the TARE/ESC pushbutton, prior to troubleshooting the system.



A-2-B alarm Icon

OK (GREEN) No Alarms

STOP (RED) Shutoff condition Alarm, Overload, Or A-2-B

Clear alarm code

Program/Operating Mode Alarm/Warning message

The ICONS on the right hand side of the display indicate the condition of the system.

Hook Block Icon — ***When clear no A-2-B condition. When it turns RED, system is in A-2-B condition.***

OK Icon — ***When it turns GREEN, system is operational, no conditions or alarms are present.***

STOP Icon — ***When Clear system is operational. When it turns RED system is in a condition or alarm is present. Lock out system is de-energized.***

Alarm/Fault codes

MESSAGE	CAUSE	SOLUTION
• ALARM 6 Length output too Low	• Potentiometer inside Reel is faulty . • Possible lack of continuity in wires carrying the signals • Fault in main unit. • Length requires adjustment.	• Check cable drum spooling is proper • Check Wiring from cable reel to Head Unit • Check 5vdc supply to length pot in cable reel and output fully retracted is 0.249-0.251vdc • Replace pot if damaged
• ALARM 7 Length output too High	• Potentiometer inside Reel is faulty. • Possible lack of continuity in wires carrying the signals • Fault in main unit. • Length requires adjustment	• Check cable drum spooling is proper • Check Wiring from cable reel to Head Unit • Check 5vdc supply to length pot in cable reel • Replace pot if damaged
• ALARM 8 Length output actual too low	• Potentiometer inside Reel is faulty. • Possible lack of continuity in wires carrying the signals • Fault in main unit.	• Check Wiring from cable reel to Head Unit • Check 5vdc supply to length pot in cable reel • Check output fully retracted 0.249-0.251vdc • Replace pot if damaged • Call service
• ALARM 12 Piston Pressure Sensor output too Low	• Piston pressure transducer damaged • Possible lack of continuity in connection wires • Fault in main unit • Hydraulic fluid in connector contacts	• Check for 15vdc supply • Check for output 0.5 vdc min • Check connection wires. • Check connector for fluid on transducer and check wiring • Replace Transducer if faulty • Call service
• ALARM 13 Rod Pressure Sensor output too Low	• Rod pressure transducer damaged • Possible lack of continuity in connection wires • Fault in main unit • Hydraulic fluid in connector	• Check for15vdc supply • Check for output 0.5 vdc min • Check connection wires. • Check connector for fluid on transducer and check wiring • Replace Transducer if faulty • Call service

Alarm/Fault codes

MESSAGE	CAUSE	SOLUTION
• ALARM 15 Angle output too Low	• Angle Sensor inside Reel is faulty. • Possible lack of continuity in wires carrying the signals • Fault in main unit	•Check Wiring from cable reel to Head Electronic •Check 5vdc supply to angle sensor in cable reel • Check output zero degrees 2.49-2.51 vdc • Replace Angle Sensor if faulty • Call service
• ALARM 22 Piston Pressure Sensor output too High	• Piston pressure transducer damaged •Possible lack of continuity in connection wires •Fault in main unit Hydraulic fluid in connector contacts	•Check for 15vdc supply •Check for output • Check connection wires. • Check connector for fluid on transducer and check wiring • Replace Transducer if faulty • Call service
• ALARM 23 Rod Pressure Sensor output too High	• Rod pressure transducer damaged •Possible lack of continuity in connection wires •Fault in main unit Hydraulic fluid in connector contacts	•Check for 15vdc supply •Check for output • Check connection wires. • Check connector for fluid on transducer and check wiring • Replace Transducer if faulty • Call service
• ALARM 25 Angle output too High	Angle Sensor inside Reel is faulty. •Possible lack of continuity in wires carrying the signals •Fault in main unit	•Check Wiring from cable reel to Head Electronic •Check 5vdc supply to angle sensor in cable reel • Check output max is 5.00vdc •Replace Angle Sensor if faulty •Call service
ALARM 56 EEPROM View	Memory problem in View Display	•Call service
•ALARM 190 Head Communication	• Error in comm.	•Check 56 pin connector on Head and 4 pin connector on View. • Call Service
•ALARM 191 ASA Slope Sensor	No Communication between ASA Slope Sensor and Head Unit	Check 4 pin connector on ASA. • Call service

System Alarm Codes

Alarm Code 6 , 7 & 8 (Length Sensor)

This code is caused by the output voltage of the length sensor is lower (code 6) than the minimum, higher (code 7) than the maximum voltage or higher than the actual value (code8).

Actions to take; Level the machine, Fully retract the boom and lower the angle to zero degrees.

1. *Check the cable is spooling properly on the drum. If cable is built up on one side of drum correct it and adjust the roller guide to correct.*

2. *Remove the cover of the cable reel using a m3 allen wrench and check the +5.00vdc (Typically the voltage is about 4.94vdc) supply voltage (Brown wire) and the ground wire (white wire). See Fig 5. If the voltage is ok continue to step 2, if not check the wiring from the cable reel to the Head electronic and boom base connector for damage.*

3. *Check the output of the length sensor. The output of the length sensor when the boom is fully retracted should be approximately 0.250vdc.(Yellow wire), (tolerance 0.249 to 0.251vdc is OK). If it is higher or lower check the wiring first for damage. If the wiring is ok, press down on the length pot swing arm(Fig 6) and adjust the gear until the display indicates what the minimum boom length for that model of machine. Check the voltage and record this for later use.*

4. *If adjusting the length gear assembly and the length does not change on the display, remove the output (Yellow) wire and check if the voltage changes, if not change the length pot and adjust the length.*

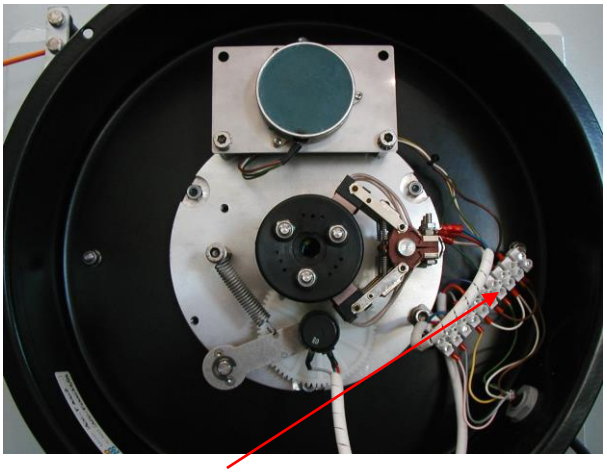
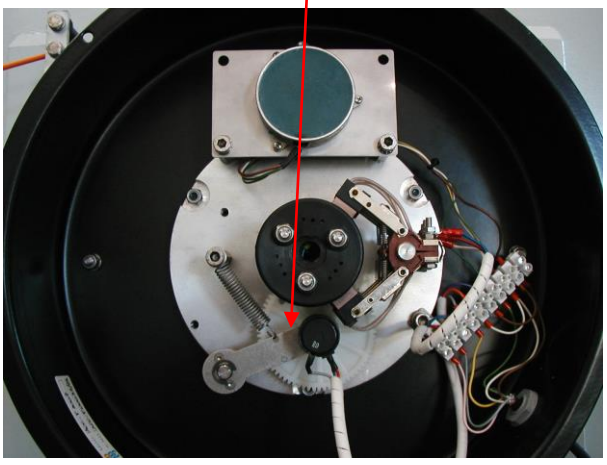


Fig 5

Fig 6



System Alarm Codes

Alarm Code 15 or 25 (Angle Sensor)

This code is caused by the output voltage of the angle sensor is lower (code 15) than the minimum or higher (code 25) than the maximum voltage.

Actions to take; Level the machine, Fully retract the boom and lower the angle to zero degrees using a angle finder to determine zero degrees. All wire color is the connection cable coming from the cab. See figure 3.

1. *Remove the cover of the cable reel using a m3 allen wrench and check the +5.00vdc (Typically the voltage is about 4.94vdc) supply voltage (Brown wire) and the ground wire (white wire). See Fig 3. If the voltage is ok continue to step 2, if not check the wiring from the cable reel to the Head electronic and boom base connector for damage.*

2. *Check the output of the angle sensor. The output of the angle when the boom is at zero degrees should be approximately 2.50vdc.(Green wire), (tolerance 2.49 to 2.51vdc is OK). If it is higher or lower check the wiring first for damage. If the wiring is ok, loosen the three screws (Fig 4) on the angle pot and adjust the pot until the display indicates what the angle finder indicates. Check the voltage and record this for later use.*

3. *If adjusting the angle pot and the angle does not change on the display, remove the output (Green) wire and check if the voltage changes, if not change the angle pot and adjust the angle in step 2.*

4. *Call for service if angle is still incorrect..*

Fig 3

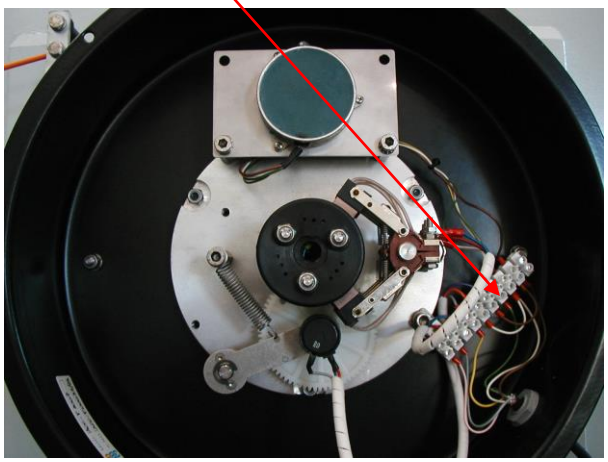
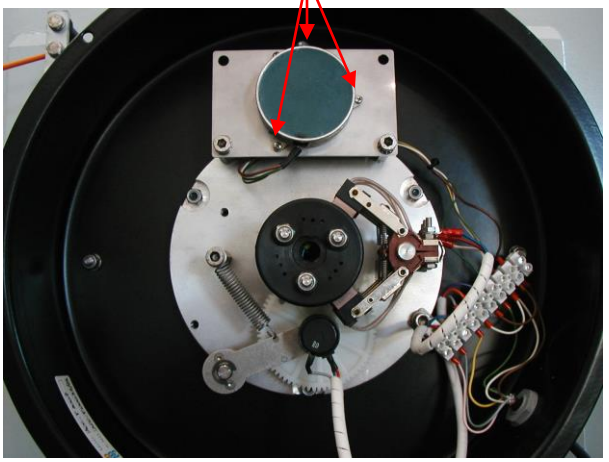


Fig 4



System Alarm Codes

Alarm Code 12 or 22 (Piston Sensor)

This code is caused by the output voltage of the piston pressure sensor is lower (code 12) than the minimum or higher (code 22) than the maximum voltage.

Actions to take; Fully retract the boom and lower the angle to zero degrees. Pressure Sensors are located on the holding valves of the lift cylinders. See figure 7.

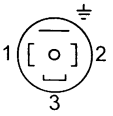
1. *Using a flat tip screwdriver loosen the screw on the connectors and switch the connector and see if the code changes to the opposite sensor, if it does check the wiring from the head electronic to the sensor and check that air is not creating the code by bleeding the sensor or hydraulic fluid is in the connector.*

2. *Check the supply voltage and ground at the connector end. See figure 7. If the code does not change and wiring is ok bleed pressure sensor or replace it.*

3. *Supply voltage for pressure sensors is 10-30vdc, Output with no load should be around .70 to .90vdc*

4. *Call for service if code is still present.*

Fig 7



PIN	3 Wires
1	+VB
2	output signal 0,5 .. 5,5 V
3	GND

System Alarm Codes

Alarm Code 13 or 23 (Rod Sensor)

This code is caused by the output voltage of the rod pressure sensor is lower (code 13) than the minimum or higher (code 23) than the maximum voltage.

Actions to take; Fully retract the boom and lower the angle to zero degrees. Pressure Sensors are located on the holding valves of the lift cylinders. See figure 8.

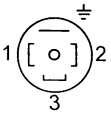
1. *Using a flat tip screwdriver loosen the screw on the connectors and switch the connector and see if the code changes to the opposite sensor, if it does check the wiring from the head electronic to the sensor and check that air is not creating the code by bleeding the sensor or hydraulic fluid is in the connector.*

2. *Check the supply voltage and ground at the connector end. See figure 8. If the code does not change and wiring is ok bleed pressure sensor or replace it.*

3. *Supply voltage for pressure sensors is 10-30vdc, Output with no load should be around .50 to .70vdc*

4. *Call for service if code is still present.*

Fig 8



PIN	3 Wires
1	+VB
2	output signal 0,5 .. 5,5 V
3	GND

System Alarm Codes

Alarm 56 EEPROM fault View

1. *Cycle power on the display and check, press and release the TARE/ESC pushbutton to clear.*
2. *CALL SERVICE*

Alarm code190 Communication from Head electronic

1. *Check that 56 pin connector on the head is connected*
2. *Check cable from View to Head for continuity.*
3. *Replace Head or CALL SERVICE*

Alarm Code 191 ASA Slope Sensor

1. *Check 4 pin connector on slope sensor is connected.*
2. *Check wiring between slope sensor and head electronic for continuity*
3. *Replace Slope sensor or CALL SERVICE*

NOTE

Do not check wiring for output from any can bus component when power is applied to the system. Damage to the system will be the result

System Fault Conditions

Engine Speed control; idle, speed 1 and speed 2 settings(F1, F2 or F3 pushbuttons)
See page 27 for more information

1. *Check wiring between View Display and Cummins ECM module for damage. See wiring diagram.*
2. *Check relays in control box.*
3. *Call Service*

Engine faults Icons;Outputs from the Cummins ECM module to enable these functions.

Functions from the Cummins ECM are Oil pressure, Water temperature, Oil Temperature, Battery level, RPM, SPN, FMI and Hour meter.

1. *Check wiring harness from Head to ECM. See wiring diagram.*
2. *Call Service*

Digital outputs from machine sensors;

Air filter, Hydraulic Oil temperature, Pilot Filter, Hydraulic filter, Water in Fuel, and Fuel level.

1. *Check wiring harness from Head to machines sensors. See wiring diagram*
2. *Call Service*

System Fault Conditions

A-2-B alarm (A-2-B Switch) The display hook block icon turns RED indicating an A-2-B condition

This code is caused by an open circuit in the A-2-B switch.

Actions to take; Fully retract the boom and lower the angle to zero degrees.

1. *Check if the machine is in a A-2-B condition, lower hook block.*
2. *Check if the cable or connectors are damaged between the switch to the electronic in the cab.*
3. *Remove the four screws in the switch cover and check the micro-switch for continuity. or 10-30vdc supply voltage.*
4. *Check for moisture, dry and seal connector.*
5. *Replace the switch or cable.*
6. *Call for service if code is still present.*

Fig 9

Cable replacement

Remove the four mounting bolts and remove the reel from the boom. Remove the cable reel cover by removing the four screws on the cover with a m3 Allen wrench (Fig 12). Then remove the cover (Fig 13).

Fig 12

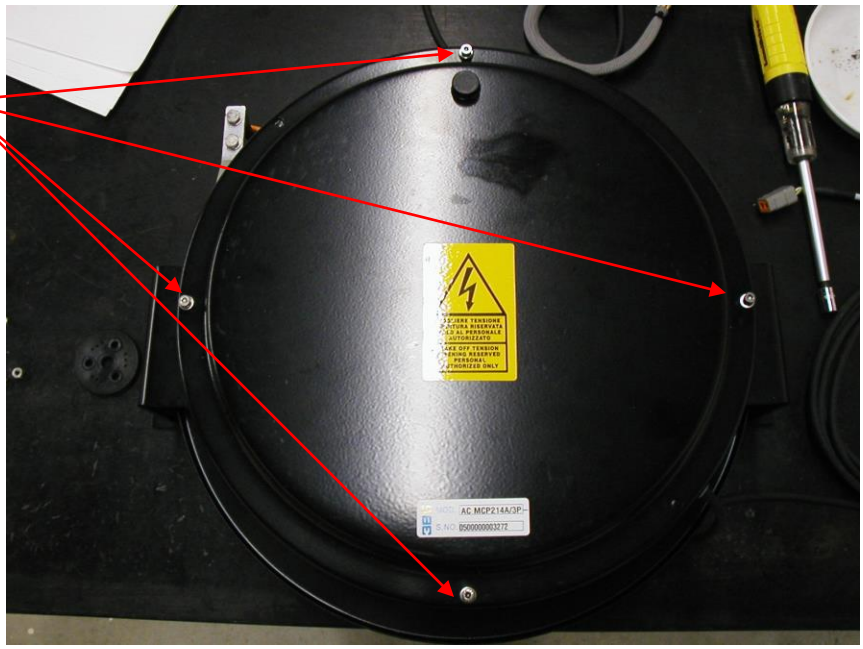
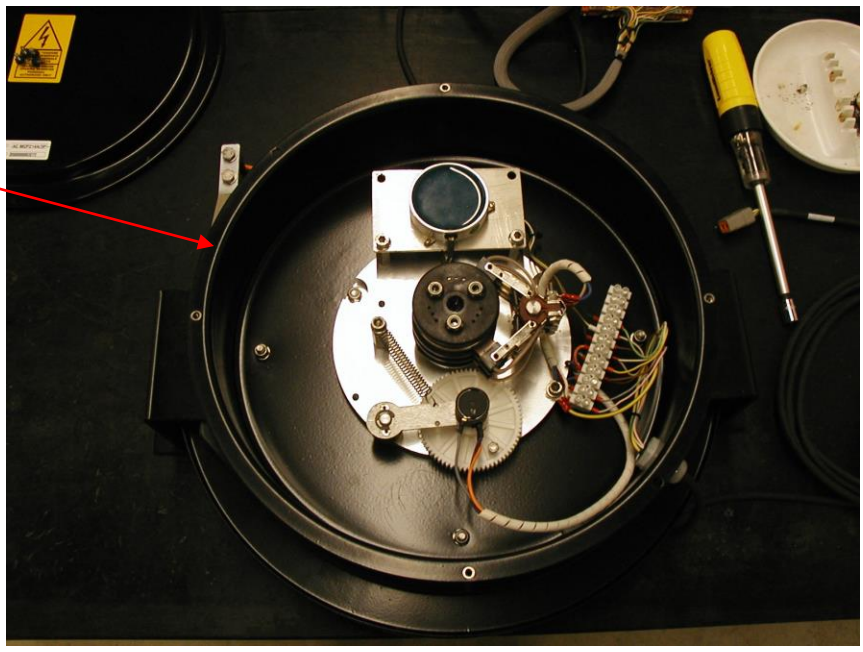


Fig 13

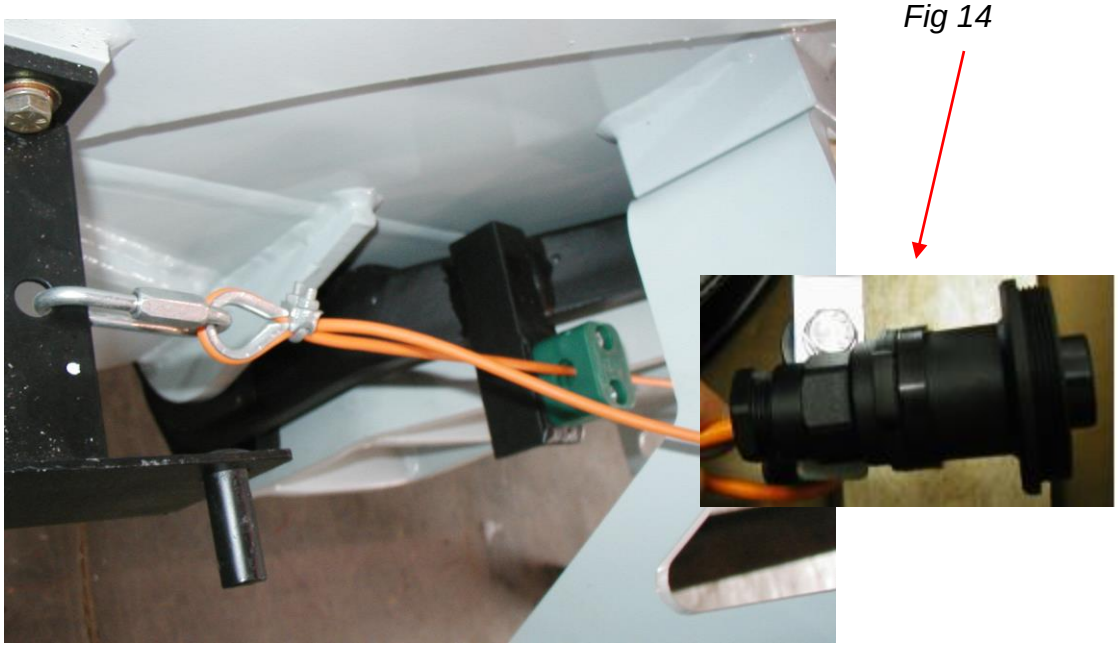


Cable replacement

Remove all tension from the cable reel to avoid injury or damage to the spring package of the cable reel.

First step to replace the three conductor cable is to remove the black connector from the end of the cable to reuse it later (Fig 14). Then we will need to remove the cable reel from the boom of The machine in order to replace the cable. Remove the four bolts from the bracket and set the reel on a surface that will not damage it (Fig 15).

Fig 14



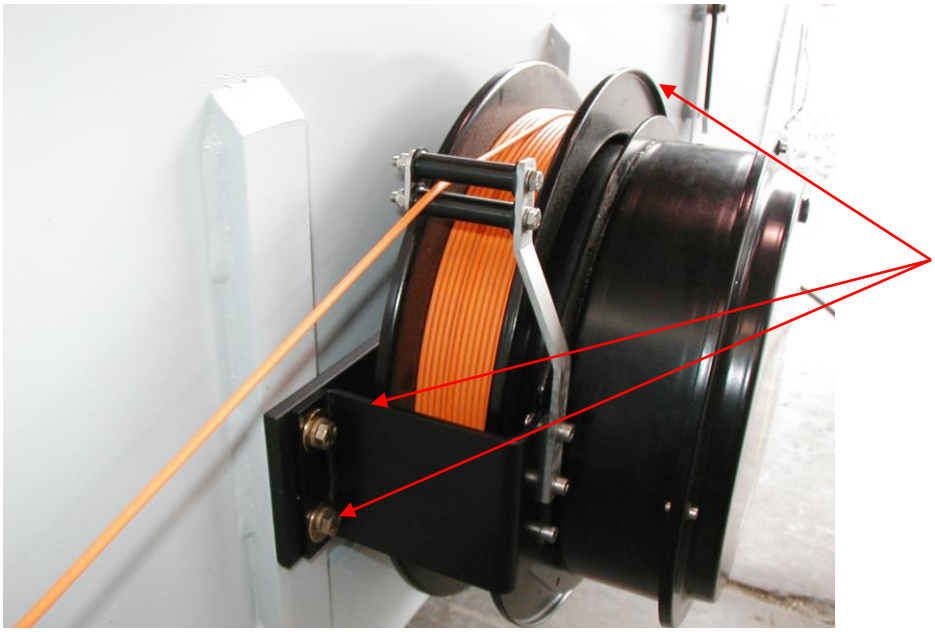


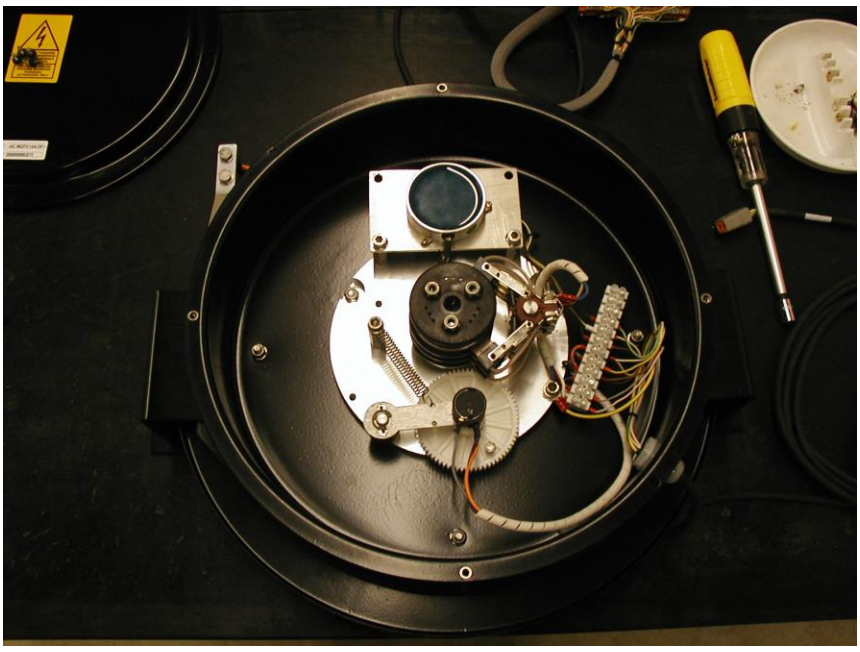
Fig 15

Cable replacement

Remove all the cable from the cable reel drum and push up the cable protective loom and cut it off at the back side of the cable reel (Fig 16). Lay the cable reel on its mounting bracket to access the front area (Fig 17).

Fig 16

Fig 17



Cable replacement

Remove three self locking nuts using a 10mm wrench (Fig 18). Carefully remove the plastic slip ring cover cap (Fig 19). You may require using a flat tip screwdriver to pry it . Insert the tip of the screwdriver just enough to catch the side of the cap. ***DO NOT INSERT IT TO DEEP OR YOU CAN DAMAGE THE SLIPRING!***

Fig 18

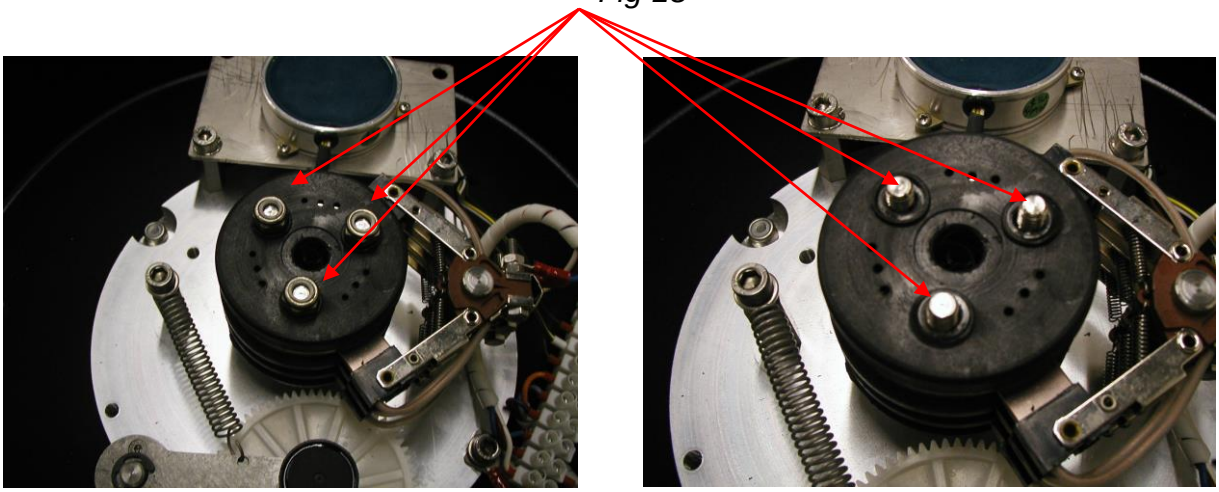
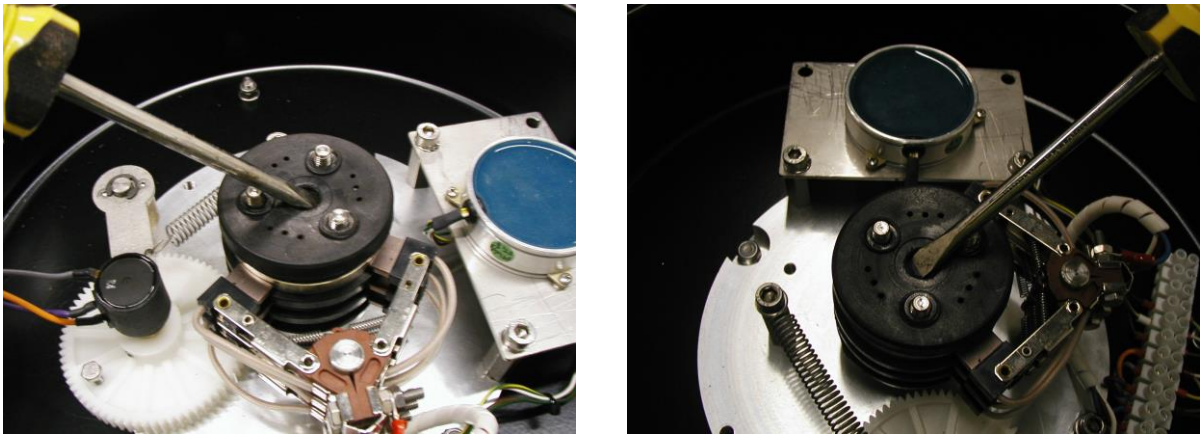


Fig 19

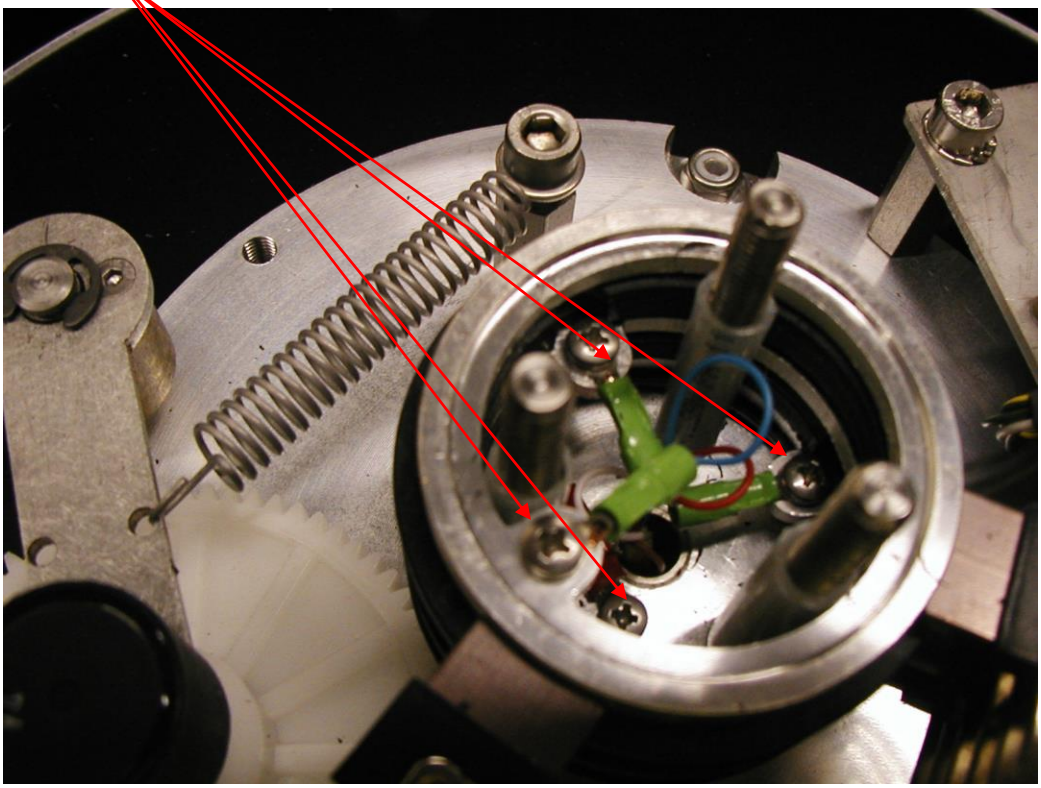
Using the screwdriver tip to carefully pry up the cap to access the wiring. Use the hardware as a lever for the screwdriver.



Cable replacement

Now that the cap is remove we can remove the existing cable. Remove the four Phillips head screws, noting the color code and location on the slip ring. Cut the ring terminals off. (Fig 20).

Fig 20



Wiring code

Collector

Bottom = White

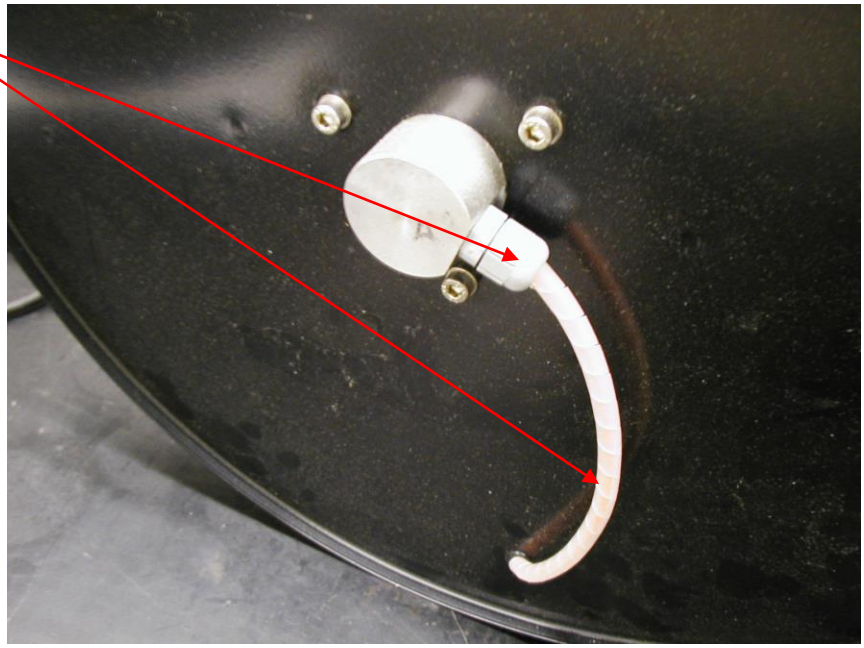
Middle = Red

Top = Blue

Shield = base

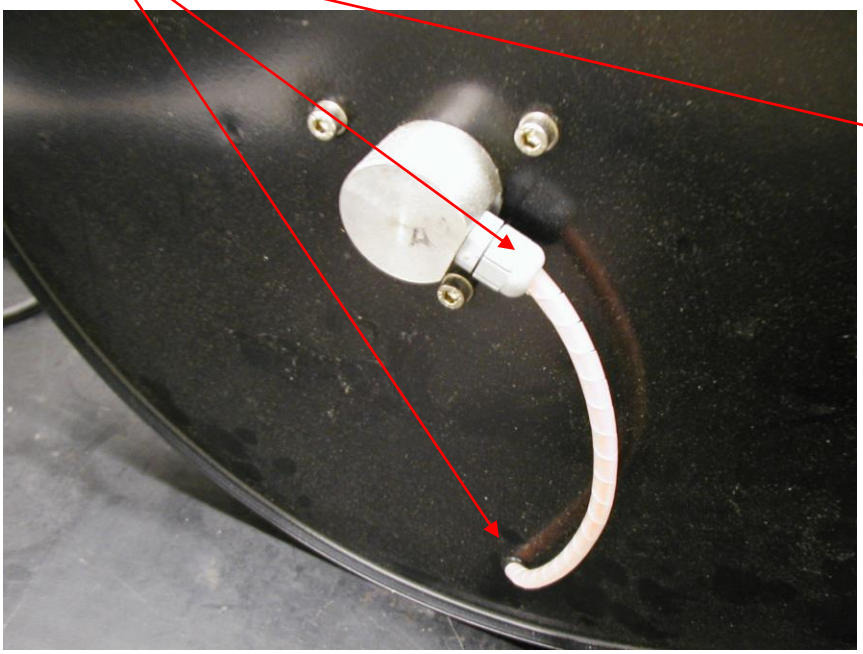
Cable replacement

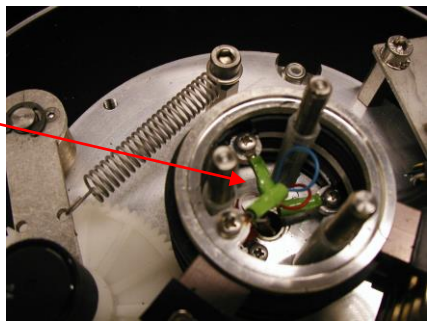
Set the cable reel on its side, loosen the pg strain relief connector and remove the cable (Fig 21).



Strip back one end of the replacement cable the same length as the old cable or approximately 12 inches and feed it through the cable reel drum access hole from the inside of the drum area and then into the base connector and up into the slip ring collector Fig 22).

Fig 22

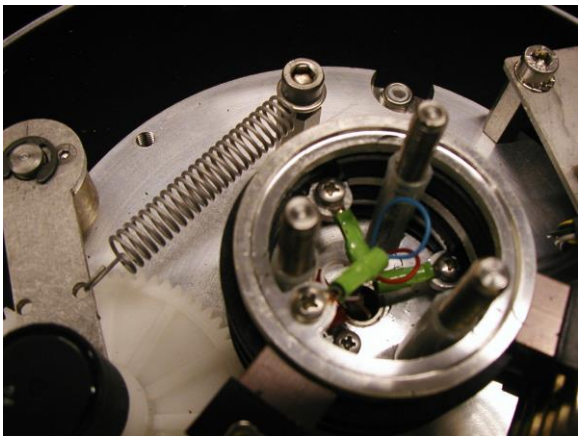


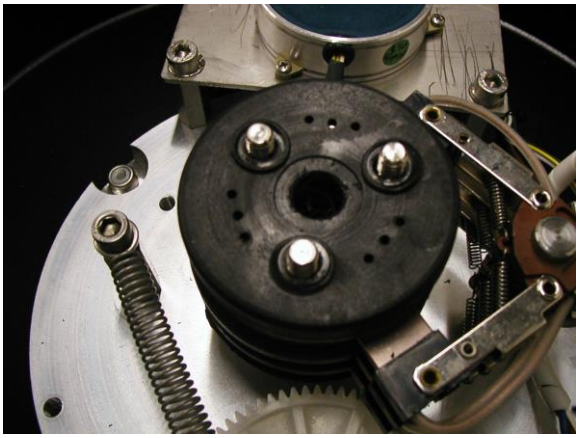


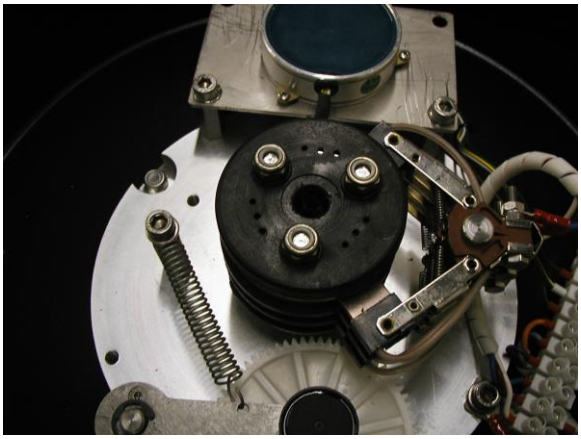
Cable replacement

The cable inserted into the pg strain relief must have the outer jacket on in order for the strain relief to work. Tighten the pg connector strain relief nut. Cut off any access wire inside the slip ring and install the ring terminal and connect the wire to the proper terminal of the slip ring collector. See page 23 for wiring.

Tighten the phillips screws and replace the cap and self locking nuts.

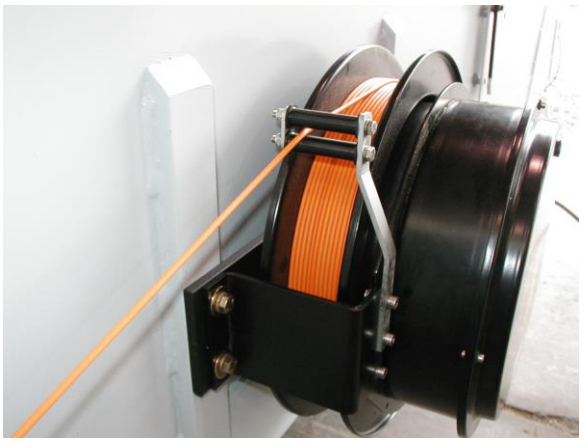


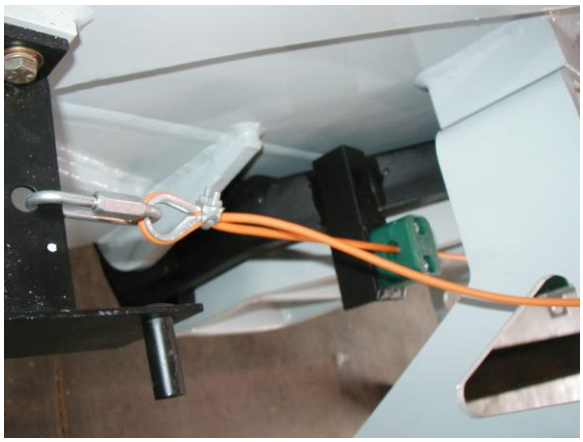




Cable replacement

Install the replacement cable back onto the drum and install it back on the boom. Feed the cable through the guides to the boom tip and connect the strain relief and the black connector. The tension on the reel will be automatic when you pull out the cable. If not tension the reel 3 to 5 wraps and then route it to the boom tip.





See page 21 and 23 for wiring

The length will require adjustment see page 19 & 20 for angle or length adjustment.

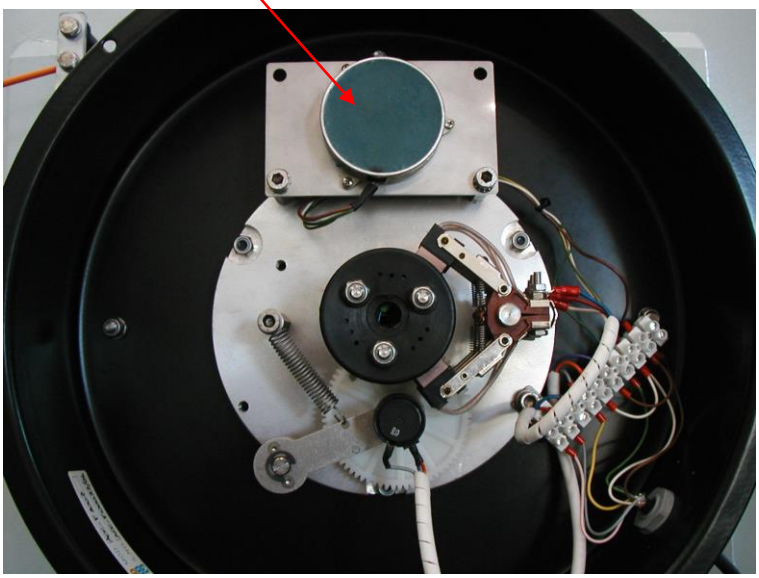
Angle adjustment

Fully retract the boom and lower the angle to zero degrees using a angle finder to determine zero degrees.Remove the cover of the cable reel and check the +5.00vdc (Typically the voltage is about 4.94vdc) supply voltage (Brown wire) and the ground wire (white wire). The output of the angle when at zero degrees should be approximately 2.50vdc.(Green wire), (tolerance 2.49 to 2.51vdc is OK). Check the angle indication on the display (18) for accuracy at zero degrees.

If it is not correct loosen the three mounting screws with a flat tip screwdriver and adjust the pot until the angle indicates zero degrees on the display. Tighten the screws and check it at other angles for accuracy.

18

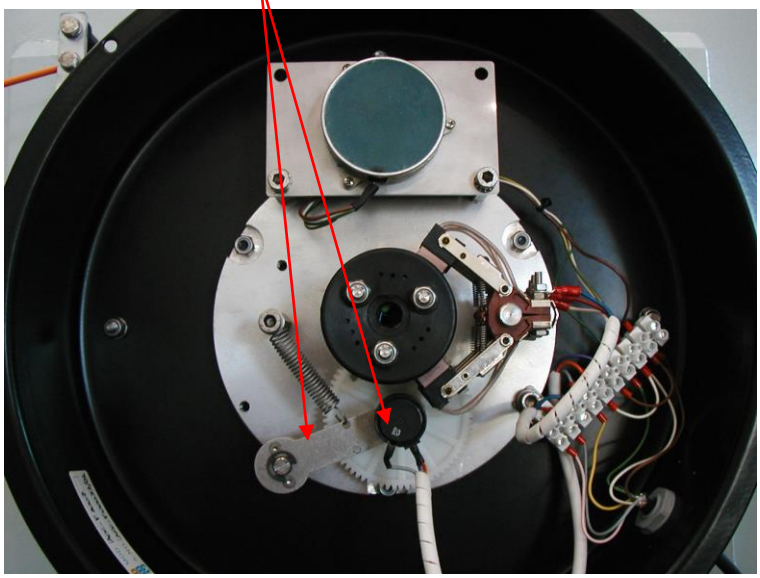
Angle sensor (ASA)



Length adjustment

Check the voltage output of the length pot is approximately .250vdc (yellow wire), (tolerance of .249 to .251)with fully retracted boom, if not adjust the length gear assembly until it is. Check the length indication on the display (19). If it is correct , extend the boom and check the fully extended length. The Brown wire (supply voltage) and White wire (Ground) used for the angle is the same supply voltage and ground for the length.

Length sensor and gear assembly



Length	Min	Max	
3612	29.1’	70.0’	Pull/Pin
3612	29.7’	71.3’	Full Power
6010	32.6’	80’	Full Power
8012	39’	90’	Full Power
9010	34’	105’	Full Power
10010MX	37.5’	111.6’	4 section
14010	37.5’	111.6’	4 section
15010	37.5’	111.6’	4 section
20010	42’	128’	
200RS	26.1’	54.1’	
26011	16.6”	27.3’	
30011	27.7’	42.7’	

A-2-B wiring

The circuit is supplied at 10-30 vdc.

A-2-B wire	terminal	Connector terminal	
Yellow wire	22	N	4.7k resistor inline
White wire	21	L	

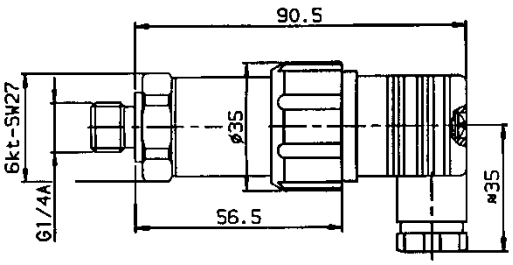
Cable reel end.

Cable reel wires	Connector wire terminals
Red wire	N
White wire	L

Pressure sensors

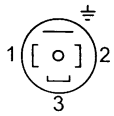
Troubleshooting the pressure sensors is used in the auto diagnostics in the operators manual.

Threads on pressure sensors are ¼"BSPP



TECHNICAL SPECIFICATIONS

PIN CONNECTIONS



PIN	*3 Wires*
1	*+VB*
2	*output signal 0,5 .. 5,5 V*
3	*GND*

INPUT DATA

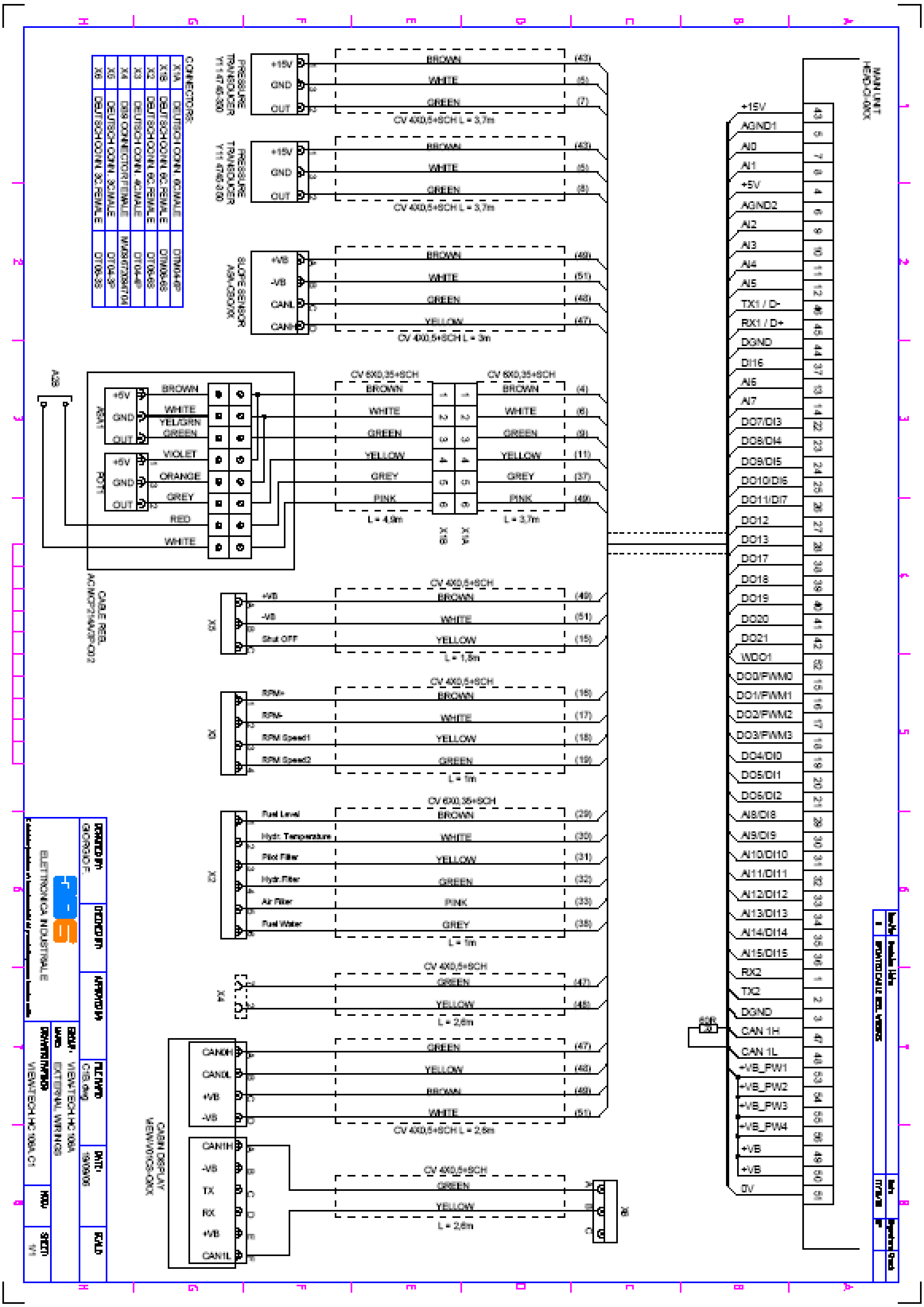
•*Measuring ranges*	*350 bar*
•*Overload ranges*	*800 bar*
•*Max pressures*	*2000 bar*
•*Parts in contact with oil*	*Stainless steel ; Viton seal*

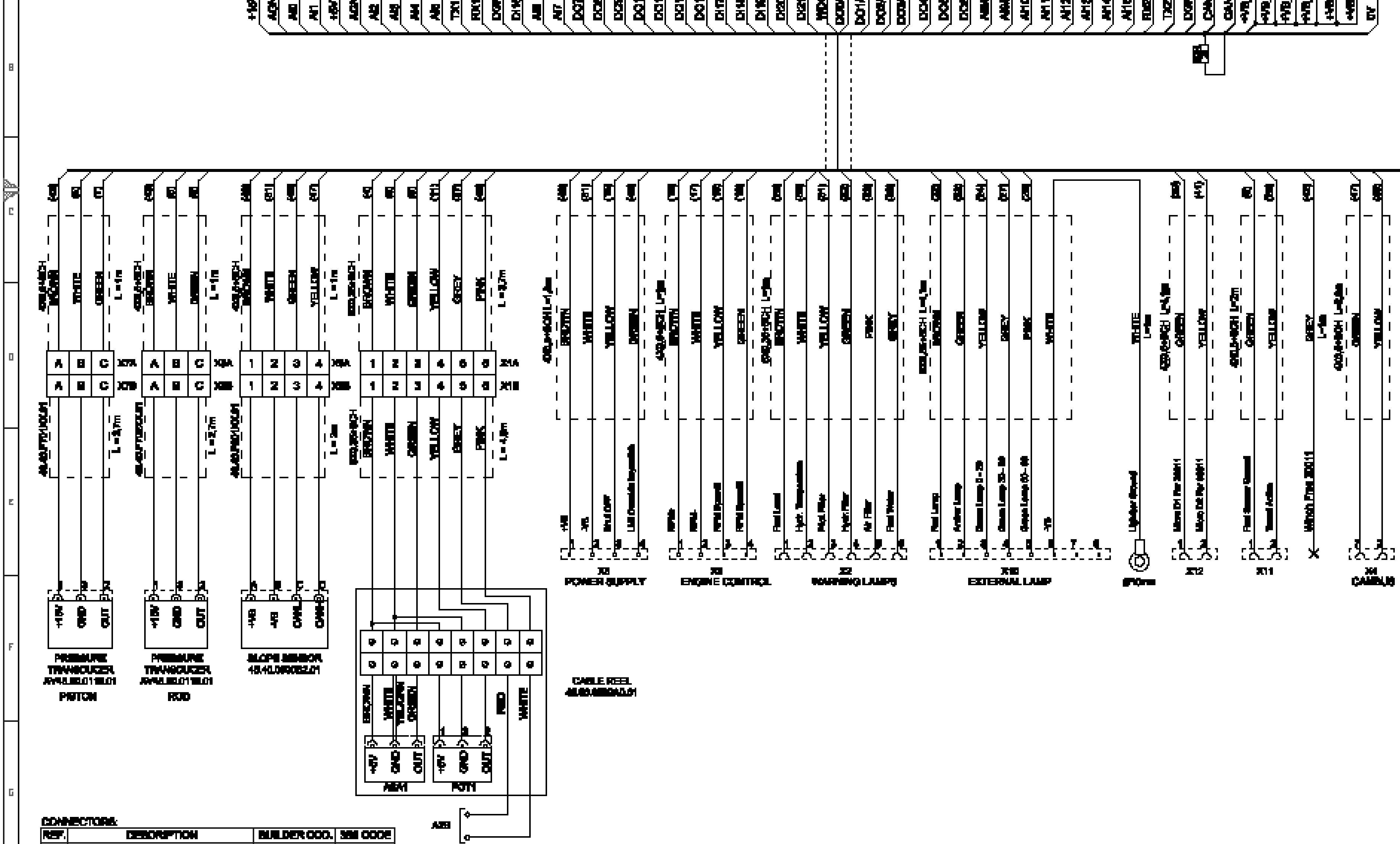
OUTPUT DATA

•*Output Signal*	*0,5 ... 5,5V*

OTHER DATA

•*Supply voltage*	*0 - 12 ...30V*
•*Current consumption*	*ca.15mA*
•*Life expectancy*	*10^6 load cycle*


+15V
GND
OUT
BROWN
WHITE
GREEN
YELLOW
CV 4X0,5+SCH L = 3,7m
CV 4X0,5+SCH L = 3m
+VB
-VB
CANL
CANH
CV 6X0,35+SCH
YEL/GRN
VIOLET
ORANGE
GREY
PINK
RED
L = 4,9m
L = 3,7m
Shut OFF
L = 1,8m
RPM+
RPM-
RPM Speed1
RPM Speed2
L = 1m
Fuel Level
Hydr. Temperature
Pilot Filter
Hydr.Filter
Air Filter
Fuel Water
L = 2,6m
CANOH
CANOL
CAN1H
TX
RX
CAN1L
CV 4X0,5+SCH L = 2,6m
AGND1
AI0
AI1
+5V
AGND2
AI2
AI3
AI4
AI5
TX1 / D-
RX1 / D+
DGND
DI16
AI6
AI7
DO7/DI3
DO8/DI4
DO9/DI5
DO10/DI6
DO11/DI7
DO12
DO13
DO17
DO18
DO19
DO20
DO21
WDO1
DO0/PWM0
DO1/PWM1
DO2/PWM2
DO3/PWM3
DO4/DI0
DO5/DI1
DO6/DI2
AI8/DI8
AI9/DI9
AI10/DI10
AI11/DI11
AI12/DI12
AI13/DI13
AI14/DI14
AI15/DI15
RX2
TX2
CAN 1H
CAN 1L
+VB_PW1
+VB_PW2
+VB_PW3
+VB_PW4
+VB
0V



CONNECTORS:

REF.	DESCRIPTION	BUILDER COD.	386 CODE
X1A	6 POLES MALE DEUTSCH CONN.	DTM04-6P	[illegible]
X2	6 POLES FEMALE DEUTSCH CONN.	DT06-6S	[illegible]
X3	4 POLES MALE DEUTSCH CONN.	DT04-4P	[illegible]
X4	SUB-D 9 POLES FEMALE CONN.	09 67 209 4704	[illegible]
X5	4 POLES MALE DEUTSCH CONN.	DT04-4P	[illegible]
X6A	CIRCULAR CONN. 4 POLES FEMALE	[illegible]	[illegible]
X7A	3 POLES FEMALE DEUTSCH CONN.	DT06-3S-E008	[illegible]
X8A	3 POLES MALE DEUTSCH CONN.	DT04-3P	[illegible]
X9A	4 POLES MALE DEUTSCH CONN.	DT04-4P	[illegible]
X10	8 POLES FEMALE DEUTSCH CONN.	DTM06-08SA	[illegible]
X11	2 POLES MALE DEUTSCH CONN.	DTM04-2P	[illegible]
X12	2 POLES MALE DEUTSCH CONN.	DTM04-2P	[illegible]

CAD DRAWING
HANDLING ON CAD SYSTEM ONLY

60.VT.H0106D.01

Division 386

TOOL TYPE: VIEW-TECH.HC106D
EXTERNAL WIRINGS

Engine Icons

Oil Pressure, Oil Temperature, and Water Temperature are red or RPM gauge, Water Temperature, Battery gauge, Oil pressure gauges are Inoperable.

These icons are supplied to the system via the CAN BUS/ECM on the engine directly.
Check that the 6 pin connector is connected to the back of the View display.
If it is connected check it for any damage to the wire to the ECM on the engine.
If no damage exists, replace the View display or contact Mantis Crane Service.

Air Filter Warning, Hydraulic Oil temperature, Pilot filter Warning, or Hydraulic oil filter icon are red;

These icons are digital inputs to the View system via a 6 pin connector behind the operators seat. These inputs are switched to ground to enable the icon. The inputs can be checked by disconnecting the 6 pin connector and inserting a small wire on the system wire harness side Into the proper pin out and connect it directly to a ground. If the icon color is no longer red the issue is between the connector and the sensor.

If the icon is still red check the wiring to the head unit, and the 4 pin connector on the View Display, if no damage exists replace the Head unit. The Head unit controls these inputs.

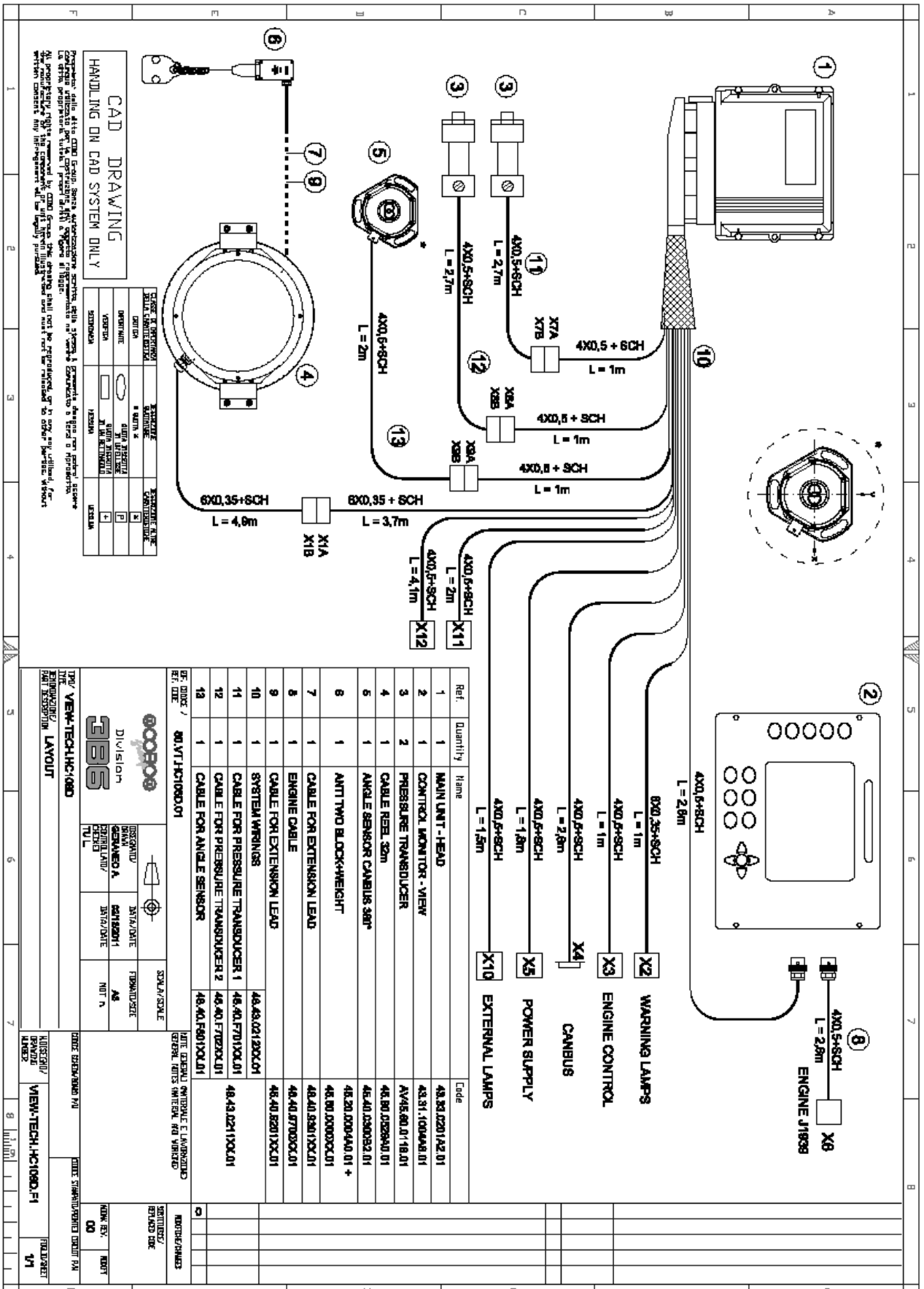
Water in Fuel Warning ;

This icon is a digital input to the View system via a 6 pin connector behind the operators seat. This input is a 12vdc switched input to enable the icon. The input can be checked by disconnecting the 6 pin connector and inserting a small wire on the system wire harness side
Into the proper pin out and connect it directly to a 12 vdc source. If the icon color is no longer
red the issue is between the connector and the sensor.

If the icon is still red check the wiring to the head unit, and the 4 pin connector on the View Display, if no damage exists replace the Head unit. The Head unit controls this input.

Fuel Gauge:

This gauge is a ohm value. When the gauge is indicating empty the value should be around 80-90 ohms on the sending tank unit and wiring harness. The ohm value is around 0 when the gauge indicates full. The unit will indicate a Low Fuel Level message at the 12% level and the audible alarm will sound. The audible alarm can be silenced momentarily by press and releasing the horn pushbutton.



Ref.	Quantity	Name	Code
1	1	MAIN UNIT - HEAD	49.53.0201A2.01
2	1	CONTROL MONITOR - VIEW	43.31.1004A8.01
3	2	PRESSURE TRANSDUCER	AV45.60.01/10.01
4	1	CABLE REEL 32m	46.80.0528A0.01
5	1	ANGLE SENSOR CANBUS 360°	46.40.0300B2.01
6	1	ANTI TWO BLOCK+WEIGHT	45.20.0004A0.01 + 45.80.0000DX.01
7	1	CABLE FOR EXTENSION LEAD	46.40.9301XX.01
8	1	ENGINE CABLE	46.40.9700DX.01
9	1	CABLE FOR EXTENSION LEAD	46.40.8201XX.01
10	1	SYSTEM WIRING	46.49.0211XX.01
11	1	CABLE FOR PRESSURE TRANSDUCER 1	46.40.F701XX.01
12	1	CABLE FOR PRESSURE TRANSDUCER 2	46.40.F702XX.01
13	1	CABLE FOR ANGLE SENSOR	46.40.F601XX.01

DISEGNATO/ DRAWN	GERHARD A.	DATA/DATE	02/12/2011	SCALA/SCALE	
CONTROLLATO/ CHECKED	TV L	DATA/DATE		FORMATO/SIZE	A3
				FOGLIO/SHEET	1/1

TIPO/ TYPE	VIEW-TECH.HC106D
DENOMINAZIONE/ PART DESCRIPTION	LAYOUT

MATT. GREZZI/ MATERIALE LAVORAZIONI GENERAL PARTS MATERIAL AND WORKING	
SOSTITUISCE/ REPLACED CODE	
RIDISEGNATO/ REDRAWN	
CODICE STAMPATO/PRINTED CIRCUIT PAN	
CODICE DISEGNO/DRAWING PAN	
NUMERO REV.	00
REVISIONE	
NUMERO DISEGNO/ DRAWING NUMBER	VIEW-TECH.HC106D.F1

Rev 1	*10-19-11*	*Revised email address on front page*
Rev 2	*11-28-11*	*corrected page 19 length indication*
Rev 3	*12-14-11*	*added new wire harness page 27 with disconnects page 29 layout, wiring additions, plus new software version 1.5A0*
Rev 4	*1-19-12*	*Updated for 1.5A1 software. Changed angle/length output tolerances page 5,6,7,8,22 and 23*
Rev 5	*2-9-12*	*Changed logo and contact information on cover page to COBO International.*
Rev 6	*11-6-12*	*Updated to 1.5A2 software version. No changes for troubleshooting. Cover page updated only.*
Rev 7	*2-21-13*	*Contact information change cover page.*
Rev 8	*3-28-19*	*SW version up to 1.5A4*
Rev 9	*6-28-19*	*Corrected alarm code 13 and 23 text page 5 & 6.*