SKF alarm and display module CMPT DCL

Part No. 32163200
Revision D

Instruction Manual

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Table of Contents

1 Description

Figure 1-1: CMPT DCL display and alarm module

This Instruction Manual provides detailed wiring connection and configuration information for the CMPT DCL display and alarm module.

The CMPT DCL is configured by SKF when it is part of an assembled CMPT enclosure. The CMPT DCL must otherwise be properly installed and configured by the user.

Important: Please read this Instruction Manual and the cautionary notes thoroughly.

- The SKF CMPT DCL is a digital alarm and display module. It is part of a machinery fault detection system to monitor analog signals from the SKF CMPT CTU vibration and temperature transmitter, various thermocouples and Resistive Temperature Detectors (RTDs).
- The DCL is a single channel module with digital display and alarm function with LED event lamp and relay contacts.
- The front panel digital display provides the user a visual indication of the monitored signal. The display can be scaled to indicate vibration (gE, g, mm/s, inch/s), temperature (°C, °F), etc. The DCL has programmable alarm, relay and variable time delay functions. The DCL can indicate HIGH, LOW, HIGH-LOW, and various other alarm limits. The front panel event lamp illuminates (red) to indicate alarm.
- The relay contacts are programmable with various options (Normally Open/Normally Close, Non-latching/latching).
- The DCL provides a 4 to 20 mA output signal proportional to the scaled analog input signal.

- Two CMPT DCL modules are needed for stand-alone monitoring of an SKF CMPT CTU vibration transmitter (one each for vibration and temperature). One CMPT CTU and two DCL modules together are a user-friendly fault detection system of machinery vibration and temperature.
- The CMPT CTU transmitter can also be connected directly to a PLC/DCS automation system without the DCL modules.

2
Features

- Monitors various inputs
  - Current (mA)
  - DC voltage (i.e. vibration or temperature signals from CMPT CTU)
  - Thermocouple
  - Resistive Temperature Detector (RTD)
- Digital LED display of monitored signals
- Programmable alarm function (one channel)
  - Alarm on HIGH, LOW or HIGH-LOW signal input, etc.
  - Front panel LED event lamp
  - Relay contacts
    - ✓ Normally Open or Normally Closed
    - ✓ Latching or non-latching
  - Time delay (0 to 9 999 seconds)
- Analog output signal (4 to 20 mA)
- Front panel user configurable
  - Input type
  - Display scaling
  - Alarm function
  - Analog output scaling
- No need for voltmeter and screw driver to set alarm function
- 35 mm DIN rail mounted

3
Specifications

Power requirements

Supply voltage:	24 V AC/DC (20 to 28 V AC/DC)
Supply current:	200 mA, maximum
Power:	6 W, maximum

Sensor input

Current*:	4 to 20 mA, 0 to 20 mA (Input impedance: 50 Ω)
Voltage:	0 to 10 V DC (Input impedance: 100 KΩ or greater) 0 to 1 V DC, 0 to 5 V DC, 1 to 5 V DC
Thermocouple:	K, J, R, S, B, E, T, N, PL-II, C (W/Re5-26). External resistance 100 Ω or less
RTD:	Pt100, JPt100 three wire system. Allowable input wire resistance 10 Ω or less per wire

*50 Ω shunt resistor (0.1% precision) required at input terminals (not included)

Alarm function

LED event lamp on front display (red)

Relay contact: 48 V DC or AC / 1,0 Amp, maximum

Programmable

- ✓ Alarm setting value
- ✓ Optional alarm on HIGH limit, LOW limit, HIGH-LOW limit, HIGH-LOW range limit
- ✓ Optional Normally Open or Normally Closed relay contacts
- ✓ Optional Non-latching or latching relay contacts
- ✓ Variable time delay (0 to 9 999 seconds)

Output

Analog output signal (4 to 20 mA) proportional to scaled input

Digital display

Four H/7,4 mm x W/4 mm high-red LEDs,
Scaleable for vibration (gE, g , mm/s, inch/s), temperature (°C, °F)

Operating environment

Operating temperature:	-10 °C to 50 °C (14 °F to 122 °F)
Storage temperature:	-25 °C to 65 °C (-13 °F to 149 F°)
Humidity:	85 % maximum
IP rating:	30

Mechanical

Weight:	0,12 kg (*0.27 lbs*)
Enclosure:	Polyethylene and PET resin
Color:	Gray with green terminals
Connectors:	One 4–pole screw clamp type/ One 5-pole screw clamp type (10 total)
Wiring:	Power and analog output 0,2 mm to 1,5 mm diameter (0.008 inch to 0.06 inch) Input and relay out 0,2 mm to 0,5 mm diameter (0.008 inch to 0.03 inch)
Mounting:	35 mm DIN-rail type EN50022
Dimensions (W x H x D):	22,5 x 75 x 100 mm (0.89 x 2.95 x 3.94 inches)

Approval

CE

4
Dimensions/Front panel

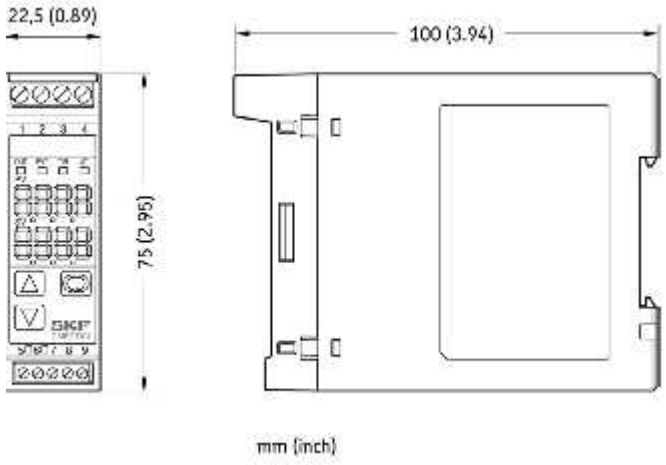

Figure 4-2: Dimensions

1 OUT indicator:
A green LED lights up when OUT (control outputs) is ON.
For DC current output type, it flashes in a 0,25 second cycle corresponding to the output manipulated variable.

2 EVENT indicator (alarm)

5 The upper row of digital characters displays the Present Value (**PV**)

6 The lower row of digital characteristics displays the Setting Value (**SV**)

7 Increase Key (△) increases the numeric value

8 Decrease Key (▽) decreases the numeric value

9 Mode key (⟲) changes the setting mode or registers the setting value. [Registers the setting value by pressing the Mode Key]

10 Sub-mode Key (beneath the SKF logo) brings up Auxiliary Function Setting Mode 2 in combination with the Mode Key.

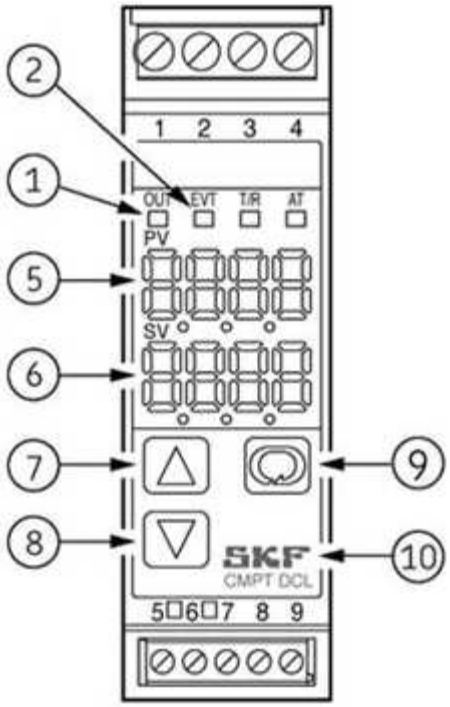

Figure 4-3: Front panel

The CMPT DCL has two rows of digital characters:

- the upper row displays the Present Value (PV). The PV is the value received from the input device (CMPT DCL, either vibration or temperature). The upper row of digital characters will display the Present Value (PV) from the CMPT DCL transmitter when in the normal operating (default) state.
- the lower row displays the Setting Value (SV). The SV is an input set by the user during configuration if the DCL is to use the HIGH-LOW or Range alarm settings. Otherwise the SV is not used.

5 Caution

Read and understand these instructions thoroughly before working with the CMPT DCL. The CMPT DCL shall be used by persons qualified to work with electrical instrumentation.

Caution - Damage or injury can result

- *The CMPT DCL is powered by 24 V DC. Do not apply higher voltage.*
- *Do not connect the sensor input (DC voltage) to the CMPT DCL (terminals 5, 6 and 7) until after the unit is powered and the input type is configured. See sections "Configuration" and "Configuration for CMPT CTU vibration and temperature transmitter".*
- *The CMPT DCL relay contacts are rated 48 VAC/DC, 1 Ω maximum. Do not apply higher voltage / current.*
- *Higher voltage (110–240 V AC) power may exist in the same proximity as the CMPT DCL. Use caution to avoid contact with any voltage source.*
- *Make sure that the power is disconnected prior to working with electrical wiring.*
- *Make sure that the CMPT DCL is installed in an environment within its specifications (see section "Specifications")*

Lightning strikes, power surges and other electrical anomalies can damage this device. For the protection of your equipment, SKF recommends the power connections be made through a surge protector.

6
Wiring Connections

The electrical connections and terminals of the CMPT DCL are listed below. The same figure is also applied to the side of each module. It is recommended to use 1,5 mm (AWG 18 gauge) wire with the DCL.

CMPT DCL	DCL terminal
+24 V DC	1
0 V DC	2
+4 to 20 mA OUT	3
4 to 20 mA COMMON	4
INPUT HIGH (+)	5
INPUT COMMON (-)	6
RTD INPUT	7
RELAY OUTPUT (contact)	8
RELAY OUTPUT (contact)	9

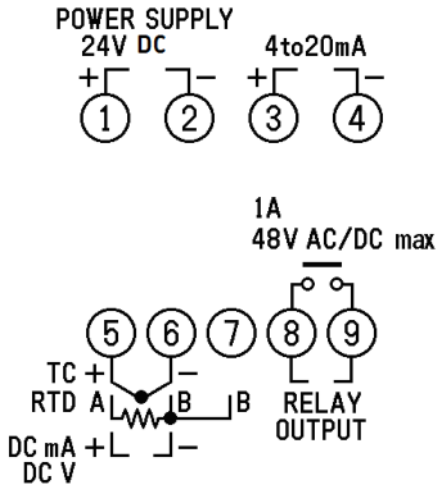

Figure 6-4: Wiring connections and terminals

Connecting the CMPT DCL with the CMPT CTU – vibration or temperature input (0 to 10 V DC)

Two CMPT DCL modules are needed to monitor both vibration and temperature from the CMPT CTU transmitter. Optionally, one CMPT DCL can monitor either vibration or temperature from the CMPT CTU. The following connections are made to connect the DCL with the CTU.

	CMPT CTU terminal to	**CMPT DCL terminal**
Vibration		
0 – 10 V VIB OUT	16	5
VIB COMMON OUT	15	6
Temperature		
0–10 V TEMP OUT	13	5
TEMP COMMON OUT	12	6

7 Configuration

The CMPT DCL is configured by SKF when supplied assembled as part of an SKF CMPT enclosure. See Section "Default configuration when DCL is part of an SKF enclosure" for the default settings.

The DCL must be configured by the user if supplied as a separate component (i.e. part of a CMPT 1CM type kit).

The DCL is configured by pressing the keys on the front panel. There are four "setting modes" to set the configuration.

The four Setting Modes have the following functions:

- **Main Setting Mode** (Press the Key (Key 9) to enter this mode) – Sets the desired value for the Setting Value (SV). The setting value is used as part of the alarm level setting if a High-Low or Range type monitoring is desired.
- **Sub-Setting Mode** (Press the Key while holding the Key) – Sets the Alarm setting and other optional features.
- **Auxiliary Function Setting Mode 1** (Press the Key while holding the Key) – Locks the settings of the DCL.
- **Auxiliary Function Setting Mode 2** (Press the Key while holding the Key beneath the SKF logo) – Sets the input type voltage), digital display scaling, alarm mode, relay features, and alarm delay, and converter function.

The following figure is a schematic diagram of the four setting modes.

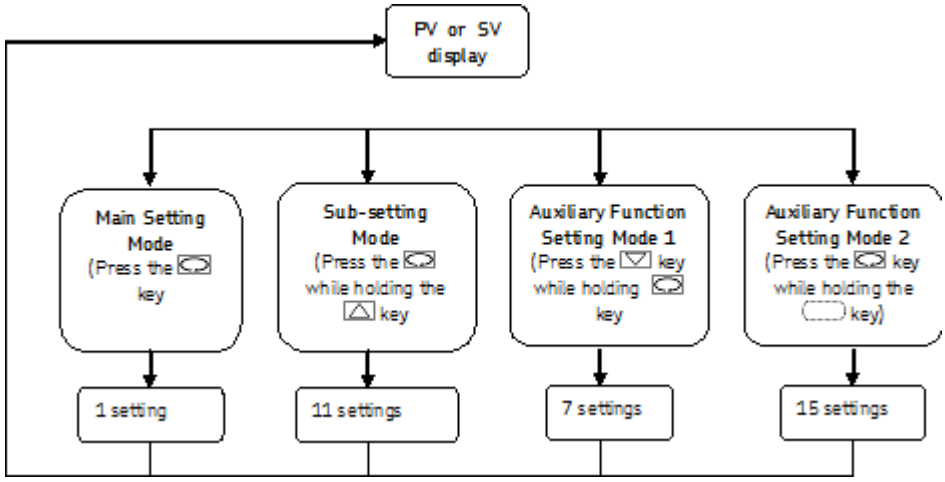

Figure 6-5: CTU configuration diagram

Note: The basic configuration of the DCL is made in Auxiliary Function Setting Mode 2.

The user must enter one or more of the 'Setting Modes' to change the default settings of the DCL or to set the initial configuration of the DCL. Upon completing the configuration of each setting mode the DCL returns to the PV display. The configuration is saved even when disconnected from the power source. The settings can be locked to prevent unintentional changes in **Auxiliary Function Setting Mode 1**.

Once entered into a Setting Mode, the user sequences through the settings using the Mode Key (Key 9). The , Keys (Keys 7 and 8) are used to set a parameter or value. The settings for the CMPT DCL to monitor the CMPT CTU are defined in the section "Configuration for CMPT CTU vibration and temperature transmitter" on the next page.

Important: Changing the configuration in Auxiliary Function Setting Mode 2 will change the alarm level setting made in Sub-setting mode. The alarm level setting should only be made after the configuration in Auxiliary Function Setting Mode 2.

The CMPT DCL is a multi-functional device. It can monitor various types of analog signals (voltage, current, thermocouple, RTDs) and display and alarm in different ways.

See the Appendix for tables for each Setting Mode, meaning of each Key step, and listing of the sensor input types.

8

Configuration for CMPT CTU Vibration and Temperature Transmitter

Configure the CMPT DCL for use with the CMPT CTU by entering the **Auxiliary Function Setting Mode 2**.

Press and hold the Mode Key (Key 9) and the Sub-mode Key (Keys 10) at the same time for 3 seconds to enter the **Auxiliary Function Setting Mode 2**.

Sequence through the **Auxiliary Function Setting Mode 2** by pressing the Mode Key(Key 9). Change the setting of each parameter using the Increase Key (Key 7) or Decrease Key (Key 8). See the steps in the section below for the correct setting of the DCL.

Vibration/Temperature and Alarm High

Follow this procedure to set the DCL to display and monitor vibration or temperature signals (0 to 10 V DC) from the CMPT CTU. This procedure sets the alarm function for High vibration and activates the relay for Normally Open (NO) and Non-latching function. See section "Alarm Limit setting and alarm options" to set the Alarm setting value.

Caution – *Damage can result. Do not connect the CMPT CTU wiring or any other DC input voltage to the CMPT DCL terminals 5 and 6 until after the unit is configured. Damage to the CMPT DCL or CMPT CTU can result.*

Enter the **Auxiliary Function Setting Mode 2** by pressing and holding the Mode Key (Key 9) and the Sub-mode Key (Key 10) at the same time for 3 seconds.

Sequence through Step 1 to 15 by pressing the Mode Key (Key 9).

Set the value / parameter in each setting using the , Keys (Keys 7 or 8). Change the parameters below to configure the DCL to monitor vibration or temperature level.

1. SEnS 0 10V — **Input type selection** (0 to 10 V DC input)
2. SFLH — **Scaling high limit setting vibration**

Vibration

The DCL can be configured to indicate the actual vibration level (gE, g, mm/s or inch/s) based on the Range setting of the CMPT CTU or the percentage of full CTU scale (100 %).

If the DCL is set for the percentage of full scale, the CMPT CTU Range can be changed without the need to re-configure the DCL. The default setting (0 to 100 % full scale) is recommended when the value of the vibration is low (i.e. Range 0 or 2). Use the tables below to set the DCL to indicate actual vibration value.

For percentage of full scale, **set the Scaling high limit setting = 9999***.

See Note below.

Scale high limit settings @100 mV/g accelerometer (sensor) sensitivity				
	Accel Env (gE3)	**Accel (g)**	**Vel (mm/s)**	**Vel (inch/s)**
Range 0	30	30	Use default setting	
Range 1	100	100	50	Use default setting
Range 2	300	300	150	Use default setting
Range 4	1000	1000	500	28

Scale high limit settings @230 mV/g accelerometer (sensor) sensitivity				
	Accel Env (gE3)	**Accel (g)**	**Vel (mm/s)**	**Vel (inch/s)**
Range 0	13	13	Use default setting	
Range 1	44	44	22	Use default setting
Range 2	130	130	65	33
Range 4	435	435	217	111

Temperature 1200 for °Celsius* or 2480 for °Fahrenheit

*default setting

Note: If the DCL was previously set for the decimal point at one place (via Manual reset setting), the above values for Scale high limit setting must be divided by 10.

3. SCLL **Scaling low limit setting**

Vibration 000*
Temperature 000 for °Celsius* or 320 for °Fahrenheit

Note: Setting the **Scaling low limit setting** = 320 also sets the Setting Value (SV in Main Setting Mode) to 320 (or 32.0 after the decimal point is set). The Alarm Level (A1) in Sub setting mode must be adjusted. See Alarm Limit Setting and Alarm Options section.

4. dP **Decimal point place setting**
00 Three digits after decimal point

5. FILT **PV filter time constant setting**
00 No change (Not applicable)

6. oLH **Out high limit setting**
1000 No Change (Change only if other than 20 mA high is desired)

7. oLL **Out Low limit setting**
00 No change (Change only if other than 0 mA low is desired)

8. AL IF **Alarm action selection**
H High limit alarm

9. A ILA **Alarm action Normally Closed / Normal Open**
noCL Normally Closed (NC) – (Energized)
rEby Normally Open (NO) – (Deenergized)

10. AHLd **Alarm HOLD function selection**
none Non-latching
HoLd Latching (Hold)

Note: When the Alarm HOLD function selection is set to HOLD (latching), the 24 V DC supply to the DCL must be interrupted to reset the relay. A manual reset button (by others) can be used for this purpose.

11. A IHy **Alarm hysteresis setting**
1.0 No change (Not applicable)

12. A Idy **Alarm action delayed timer setting**
0 Optional no change (set at desired value)

13. conF **Direct/Reverse selection**
cooL No Change (Not applicable)

14. EoUF **Output status selection when input is abnormal**
No Change (Not applicable)

15. FUnc **Controller/Converter function selection**
cnbF Converter function

The configuration in Auxiliary Function Setting Mode 2 is complete. See Section " Default Configuration when DCL is part of an SKF enclosure" for completion of installation.

IMPORTANT NOTE : CHANGING THE CONFIGURATION IN AUXILIARY FUNCTION MODE SETTING 2 WILL CHANGE THE ALARM LEVEL SETTING MADE IN SUB-SETTING MODE. THE ALARM LEVEL SETTING SHOULD ONLY BE MADE AFTER THE CONFIGURATION IN AUXILIARY FUNCTION MODE SETTING 2.

Alarm Limit Setting and Alarm Options

To set the Alarm setting, place the CMPT DCL in Sub-setting Mode.
Press and hold the Increase Key △ (Key 7) and the Mode Key ⟲ (Key 9) to enter the Sub-setting Mode.
Sequence through the Sub-setting Mode by pressing the Mode Key ⟲ (Key 9).
Change the setting of each parameter using the Increase Key △ (Key 7) or Decrease Key ▽ (Key 8). See the Steps 1 through 7 below for the correct setting of the DCL.

1. P — **OUT proportional band setting (analog out)**
100.0 No change (Not applicable)

2. I — **Integral time setting**
0 No change (Not applicable)

3. d — **Derivative time setting**
0 No change (Not applicable)

4. rSET — **Manual reset setting**
00 No change (Not applicable)

5. A1 — **Alarm setting**
Vibration 60.0 (60 % of full scale CMPT CTU Range)
Temperature 100.0 or to the desired value °C
212.0 or to the desired value °F
Typical alarm value is 100 °C (212 °F)

NOTE: Setting the **Scaling low limit setting** = 32.0 (Auxiliary function setting mode) sets the Setting Value (SV in Main Setting Mode) to 32. The Alarm Level (A1) setting must be reduced by the SV value to alarm at the desired value.
(ie., A1 = desired alarm value – SV)
Example Desired alarm value = 212 °F , Set A1 = 212 – 32 = 180

6. LP_T — **Loop break alarm time setting**
0 No change (Not applicable)

7. LP_H — **Loop break alarm span setting**
00 No change (Not applicable)

Sub-setting mode programming is complete.

If the High-Low or High Range alarm setting modes are desires, contact SKF for Instructions.

IMPORTANT NOTE: CHANGING THE CONFIGURATION IN AUXILIARY FUNCTION MODE SETTING 2 WILL CHANGE THE ALARM LEVEL SETTING MADE IN SUB-SETTING MODE. THE ALARM LEVEL SETTING SHOULD ONLY BE MADE AFTER THE CONFIGURATION IN AUXILIARY FUNCTION MODE SETTING 2 IS COMPLETE.

Completed Configuration and Connection to CMPT CTU

After the Auxiliary Function Mode 2 configuration is complete, it is permissible to connect the output from the CMPT CTU to the DCL according to Section 4. The OUT lamp on the front panel should be flashing Green. The PV should indicate the value of vibration or temperature from the CMPT CTU. The current (4 to 20 mA) analog output signal (DCL terminals 3 and 4) is proportional to the full scale set for either vibration or temperature.

Default Configuration when DCL is part of an SKF enclosure

The CMPT DCL is initially configured by SKF when included as part of an assembled enclosure. The DCL, for vibration or temperature is configured as follows:

Vibration	Percentage of full CMPT CTU scale Range	
Temperature	Celsius	0 to 120 °C
Alarm	High Level	60% of full scale for vibration / 100 °C for temperature
Relay	Normally Open (NO)	
Output scaling	Full scale	Proportional to full scale vibration or temperature (4 to 20 mA)
Function	Converter	4 to 20 mA output

Connections with Relay Contacts

The CMPT CDCL relay contact functions can operate remote low power (< 48 V DC / 1 Amp) lamps, buzzers and relays. These can be used to indicate an Alarm event. Connect the remote device to DCL terminals 8 and 9.

9
Optional Configurations

The CMPT DCL can optionally be configured to prevent changes to the configuration and to dampen the changes in display and output source values.

NOTE: When the Alarm HOLD function selection is set to HOLD (latching), the 24 V DC supply to the DCL must be interrupted to reset the relay.

Lock

The settings of the DCL can be locked to prevent unwanted changes. Enter Auxiliary Function Setting Mode 1 by pressing the Key and the Enter the Auxiliary Function Setting Mode 1 by pressing and holding the Mode Key (Key 7) and the Sub-mode Key (Key 9) at the same time for 3 seconds. See the Appendix Table 3.

There are three Lock settings.

Loc 1	None of the settings can be changed
Loc2	Only the main setting mode can be changed
Loc3	All setting values can be changed, but values are not saved after the power is turned off.

Display and Output Dampening

If the display values changes too rapidly for the User due to the dynamics of the input, it is possible to dampen the display and output signal. To dampen the display and output values enter the Auxiliary Function Setting Mode II, see section "Vibration/Temperature and Alarm High" and Appendix Table 4. to change the display, change the PV filter time constant setting (FiLt) to a value greater than 0 seconds. The maximum value is 10 seconds. Do not use too high a value or the display and output may not represent the input signal well.

10
Appendix

IMPORTANT NOTE: CHANGING THE CONFIGURATION IN AUXILIARY FUNCTION MODE SETTING 2 WILL CHANGE THE ALARM LEVEL SETTING MADE IN SUB-SETTING MODE. THE ALARM LEVEL SETTING SHOULD ONLY BE MADE AFTER THE CONFIGURATION IN AUXILIARY FUNCTION MODE SETTING 2.

The CMPT DCL has many features that can be configured to enhance the monitoring from the CMPT DCL and also for thermocouples and RTDs. This basic DCL model has some intrinsic features that are not implemented within SKF Copperhead fault detection (controller function, heater burnout, communication protocol, etc.). The configurations not applicable to the CMPT DCL are marked- NOT APPLICABLE.

See the tables below for those features.

Table 1

Character	Name, Description, Setting range **Main Setting Mode**	Default value
SV	SV	0℃
	• Sets the SV for controlled object. • Scaling low limit value to scaling high limit value (For DC input, the placement of the decimal point follows the selection)	

Table 2

Character	Name, Description, Setting range **Sub Setting Mode**	Default value
AT	**AT setting** – NOT APPLICABLE	- - - -
	• Performs PID auto-tuning. However, when PID auto-tuning does not finish after 4 hours, PID auto-tuning is shut down compulsory. • PID auto-tuning cancellation: - - - - • PID auto-tuning performance: AT	
P	**OUT proportional band setting**	2.5%
	• Sets the proportional band. • The control action becomes ON/OFF when set to 0.0 • Setting range: 0.0 to 110.0%	
I	**Integral time setting** NOT APPLICABLE	200 seconds
	• Sets the integral time. • Setting the value to 0 disables this function. • Not available for ON/OFF action. • Setting range: 0 to 1000 seconds	
d	**Derivative time setting** NOT APPLICABLE	50 seconds
	• Sets the derivative time. • Setting the value to 0 disables this function. • Not available for ON/OFF action. • Setting range: 0 to 300 seconds	

Character	Name, Description, Setting range **Sub Setting Mode**	Default value
n	**Anti-reset windup setting** NOT APPLICABLE	50%
	• Sets anti-reset windup. • Available only for PID action. • Setting range: 0 to 100%	
c	**OUT proportional cycle setting**	30 or 3 seconds
	• Sets the proportional cycle value for the control output (OUT). • Not available for ON/OFF action or DC current output. • Setting range: 1 to 120 seconds	
rSET	**Manual reset setting**	0.0
	• Sets the reset value manually. • Available only for P and PD action. • ±Proportional band converted value (For DC input, the placement of the decimal point follows the selection)	
A1	**Alarm setting**	0℃
	• Sets the action point for the alarm output. • Setting the value to 0 or 0.0 disables this function (excluding Process high and Process low alarms). When Loop break alarm and Heater burnout alarm are applied together, they utilize output terminals. • Not available when No alarm action is selected during Alarm action selection. • See (Table 5.3-1). (For DC input, the placement of the decimal point follows the selection.)	
H□□□	**Heater burnout alarm setting** NOT APPLICABLE	0.0A
	• Sets the heater current value for Heater burnout alarm. • Setting the value to 0.0 disables this function. • Self-holding is not available for the alarm output. When Alarm and Loop break alarm are applied together, they utilize common output terminals. • Available only when Heater burnout alarm is added. • Rating 5A: 0.0 to 5.0A • Rating 10A: 0.0 to10.0A • Rating 20A: 0.0 to 20.0A • Rating 50A: 0.0 to 50.0A	
LP_T	**Loop break alarm time setting** NOT APPLICABLE	0 minutes
	• Sets the action time to assess the Loop break alarm. • Setting the value to 0 disables this function. • When Alarm and Heater burnout alarm are applied together, they utilize common output terminals. • Setting range: 0 to 200 minutes	
LP_H	**Loop break alarm span setting** NOT APPLICABLE	0℃

	• Sets the action span to assess the Loop break alarm. • Setting the value to 0 disables this function. • When Alarm and Heater burnout alarm are applied together, they utilize common output terminals. • Thermocouple, RTD input: 0 to 150℃ (℉) or 0.0 to 150.0℃ (℉) • DC input: 0 to 1500 (The placement of the decimal point follows the selection)

Table 3

Character	Name, Description, Setting range **Auxiliary Function Setting Mode 1**	Default value
Lock	**Setting value Lock selection** • Locks the setting value to prevent setting errors. The setting item to be locked is dependent on the designation. • PID auto-tuning cannot be carried out when Lock1 or Lock2 is selected. • Be sure to select Lock 3 when changing the setting value frequently via communication function considering the life of non-volatile memory. • ---- (Unlock): All setting values can be changed. Loc 1 (Lock 1): None of setting values can be changed. Loc2 (Lock 2): Only main setting mode can be changed. Loc3 (Lock 3): All setting values can be changed. However, changed data reverts to their former value after power is turned off because they are not saved in the non-volatile memory. Do not change any setting item in Auxiliary function setting mode 2. If any item in Auxiliary function setting mode 2 is changed, it will affect other setting items such as SV and Alarm setting.	Unlock
Ro	**Sensor correction setting** • Sets the sensor correction value of the sensor. • Thermocouple and RTD input: –100.0 to 100.0℃ (℉) • DC input: –1000 to 1000 (The placement of the decimal point follows the selection.)	0.0℃
cSLT	**Stop bit selection** NOT APPLICABLE • Selects the stop bit. • Not available when the option C5 is not added or when Shinko protocol is selected during Communication protocol selection • Setting range: 1 or 2	1

Table 4

Caution – Damage can result: Disconnect the DC voltage input from the CMPT DCL prior to changing the configuration (selection) of the input types. The input circuit can be damaged if the input type is changed while the input is connected.

Character	Name, Description, Setting range **Auxiliary Function Setting Mode 2**	Default value
SENS	**Input type selection**	K (–200 to 1370°C)
	• Selects a sensor type and temperature unit from thermocouple (10 types), RTD (2 types), DC current (2 types) and DC voltage (4 types). • CAUTION - Disconnect the DC voltage input from the CMPT DCL prior to changing input configuration. The input circuit can be damaged if input type is changed while the input is connected.	
	K –200 to 1370°C: tC K 320 to 2500 °F: tF –199.9 to 400.0°C: t.C –199.9 to 750.0°F: t.F J –200 to 1000 °C: JC J –320 to 1800 °F: JF R 0 to 1760 °C: rC R 0 to 3200 °F: rF S 0 to 1760 °C: SC S 0 to 3200 °F: SF B 0 to 1820 °C: bC B 0 to 3300 °F: bF E –200 to 800 °C: EC E –320 to 1500 °F: EF T –199.9 to 400.0°C: T.C T –199.9 to 750.0°F: T.F N –200 to 1300 °C: nC N –320 to 2300 °F: nF PL-Ⅱ 0 to 1390 °C: PL2C PL-Ⅱ 0 to 2500 °F: PL2F C (W/Re5-26) 0 to 2315 °C: cC C (W/Re5-26) 0 to 4200 °F: cF Pt100 –199.9 to 850.0°C: Pt.C Pt100 –199.9 to 999.9°F: Pt.F JPt100 –199.9 to 500.0°C: JPt.C JPt100 –199.9 to 900.0°F: JPt.F Pt100 –200 to 850 °C: PtC Pt100 –300 to 1500°F: PtF JPt100 –200 to 500 °C: JPtC JPt100 –300 to 900 °F: JPtF 4 to 20mA DC –1999 to 9999: 4-20A 0 to 20mA DC –1999 to 9999: 0-20A 0 to 1V DC –1999 to 9999: 0 1V 0 to 5V DC –1999 to 9999: 0 5V 1 to 5V DC –1999 to 9999: 1 5V 0 to 10V DC –1999 to 9999: 0 10V	
SCLH	**Scaling high limit setting**	1370°C
	• Sets the scaling high limit value. • Scaling low limit setting value to Input range high limit value (For DC input, the placement of the decimal point follows the selection.)	
SCLL	**Scaling low limit setting**	–200°C

Character	Name, Description, Setting range **Auxiliary Function Setting Mode 2**	Default value
	• Sets the scaling low limit value. • Input range low limit value to scaling high limit setting value (For DC inputs, the placement of the decimal point follows the selection.)	
dP	**Decimal point place selection**	No decimal point
	• Selects the decimal point place. However, not available if thermocouple or RTD input is selected during the input type selection. • No decimal point: 0000 • 1 digit after decimal point: 000.0 • 2 digits after decimal point: 00.00 • 3 digits after decimal point: 0.000	
FILT	**PV filter time constant setting**	0.0 seconds
	• Sets the PV filter time constant. If the setting value is too large, it affects control result due to the response delay. • Setting range: 0.0 to 10.0 seconds	
oLH	**OUT high limit setting**	100%
	• Sets the OUT high limit value. • Not available for ON/OFF action. • Setting range: OUT low limit value to 105% • Setting greater than 100% is effective to DC current output type.	
oLL	**OUT low limit setting**	0%
	• Sets the OUT low limit value. • Not available for ON/OFF action. • Setting range: –5% to OUT high limit value • Setting less than 0% is effective to DC current output type.	
HYS	**OUT ON/OFF action hysteresis setting**	1.0℃
	• Sets the ON/OFF action hysteresis for the OUT. • Available only for ON/OFF action (P=0). • Thermocouple and RTD input: 0.1 to 100.0℃(℉) • DC input: 1 to 1000 (The placement of the decimal point follows the selection)	
AL 1F	**Alarm action selection**	No alarm action
	• Selects an alarm action type. No alarm action: ---- High limit alarm: H Low limit alarm: L High/Low limits alarm: HL High/Low limit range alarm: oI d High/Low limits alarm with standby: HL o Process high alarm: Ph Process low alarm: -Ph High limit alarm with standby: H o Low limit alarm with standby: L o	
AILA	**Alarm action Energized/Deenergized**	Energized

	• Selects the alarm action Energized (Normally Open) /Deenergized (Normally Closed). • Not available when No alarm action is selected during Alarm action selection. • Energized: nonL , Deenergized: rEVS	
AHLd	**Alarm Latching (HOLD) function selection**	Alarm Not holding
	• Selects either Alarm Non-latching (Not holding) or latching (Alarm Holding). • If alarm Latching (HOLD) function is set to Alarm Latching ("Alarm Holding"), once alarm is activated, the alarm output remains until the power is turned off. • Not available when No alarm action is selected during Alarm action selection. • Alarm Not holding: nonE , Alarm Holding: HoLd	
A1HY	**Alarm hysteresis setting**	1.0℃
	• Sets the alarm hysteresis. • Not available when No alarm action is selected during Alarm action selection. • Thermocouple and RTD input: 0.1 to 100.0℃(℉) • DC input: 1 to 1000 (The placement of the decimal point follows the selection.)	
A1dY	**Alarm action delayed timer setting**	0 seconds
	• Sets the alarm action delayed time. The alarm is activated when the setting time has passed after the input enters alarm output range. • Not available when No alarm action is selected during Alarm action selection. • Setting range: 0 to 9999 seconds	
conF	**Direct/Reverse selection**	Reverse (Heating) action
	• Selects reverse (heating) or direct (cooling) control action. • Reverse (Heating) action : HEAT • Direct (Cooling) action: cool	
AT_b	**AT bias setting**	20℃
	• Set the PID auto-tuning bias value. • Not available when DC voltage or current input is selected during Input type selection, or when action is not PID, either. • Setting range: 0 to 50℃(0 to 100℉) or 0.0 to 50.0℃(0.0 to 100.0℉)	
SV_b	**SVTC bias setting**	0
	• Control desired value adds SVTC bias value to the value received by the SVTC command. • Available only when the option C5 is added.	
EoUT	**Output status selection when input abnormal**	Output OFF

	• Selects whether the OUT (control output) is turned OFF or not when DC input is in over scale or under scale. • Available only for DC current output with DC input. • oFF (Output OFF), on (Output ON)	
FUnc	**Controller/Converter function selection** • Selects controller or converter function. • Available only when the control output is DC current output type. • Controller function: cntr, Converter function: cnbr	Controller function

Table 5

Input type (character indication) and range	
K –200 to 1370℃: t C –199.9 to 400.0℃: t .C J –200 to 1000 ℃: J C R 0 to 1760 ℃: r C S 0 to 1760 ℃: S C B 0 to 1820 ℃: b C E –200 to 800 ℃: E C T –199.9 to 400.0℃: T .C N –200 to 1300 ℃: n C PL-Ⅱ 0 to 1390 ℃: PL2C C(W/Re5-26)0 to 2315 ℃: c C	K –320 to 2500 ℉: t F –199.9 to 750.0℉: t .F J –320 to 1800 ℉: J F R 0 to 3200 ℉: r F S 0 to 3200 ℉: S F B 0 to 3300 ℉: b F E –320 to 1500 ℉: E F T –199.9 to 750.0℉: T .F N –320 to 2300 ℉: n F PL-Ⅱ 0 to 2500 ℉: PL2F C(W/Re5-26) 0 to 4200 ℉: c F
Pt100 –199.9 to 850.0℃: Pt .C JPt100 –199.9 to 500.0 ℃: JPt.C Pt100 –200 to 850 ℃: Pt C JPt100 –200 to 500 ℃: JPt C	Pt100 –199.9 to 999.9℉: Pt .F JPt100 –199.9 to 900.0℉: JPt.F Pt100 –300 to 1500℉: Pt F JPt100 –300 to 900℉: JPt F
4 to 20mA DC –1999 to 9999: 4 20A 0 to 20mA DC –1999 to 9999: 0 20A 0 to 1V DC –1999 to 9999: 0 1U 0 to 5V DC –1999 to 9999: 0 5U 1 to 5V DC –1999 to 9999: 1 5U 0 to 10V DC –1999 to 9999: 0 10U	

Table 6

Alarm action type	Description
High limit alarm	The alarm action is ±deviation setting from the SV. The alarm is activated if the input value reaches the high limit setting value. Character indication: H
Low limit alarm	The alarm action is ±deviation setting to the SV. The alarm is activated if the input value goes under the low limit setting value. Character indication: L
High/Low limits alarm	Combines High limit and Low limit alarm actions. When input value reaches high limit setting value or goes under the low limit setting value, the alarm is activated. Character indication: HL
High/Low limit range alarm	When input value is between the high limit setting value and low limit setting value, the alarm is activated. Character indication: ō I d
Process value alarm	Within the scale range of the controller, alarm action points can be set at random and if the input reaches the randomly set action point, the alarm is activated. Character indication: Process high alarm AH, Process low alarm -A H
Alarm with standby function	When the power to the controller is turned on, even if the input enters the alarm action range, the alarm is not activated. (If the controller is allowed to keep running, once the input exceeds the alarm action point, the standby function will be released.) Character indications: High limit alarm with standby: H ō Low limit alarm with standby: L ō High/Low limits alarm with standby: HL ō

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