

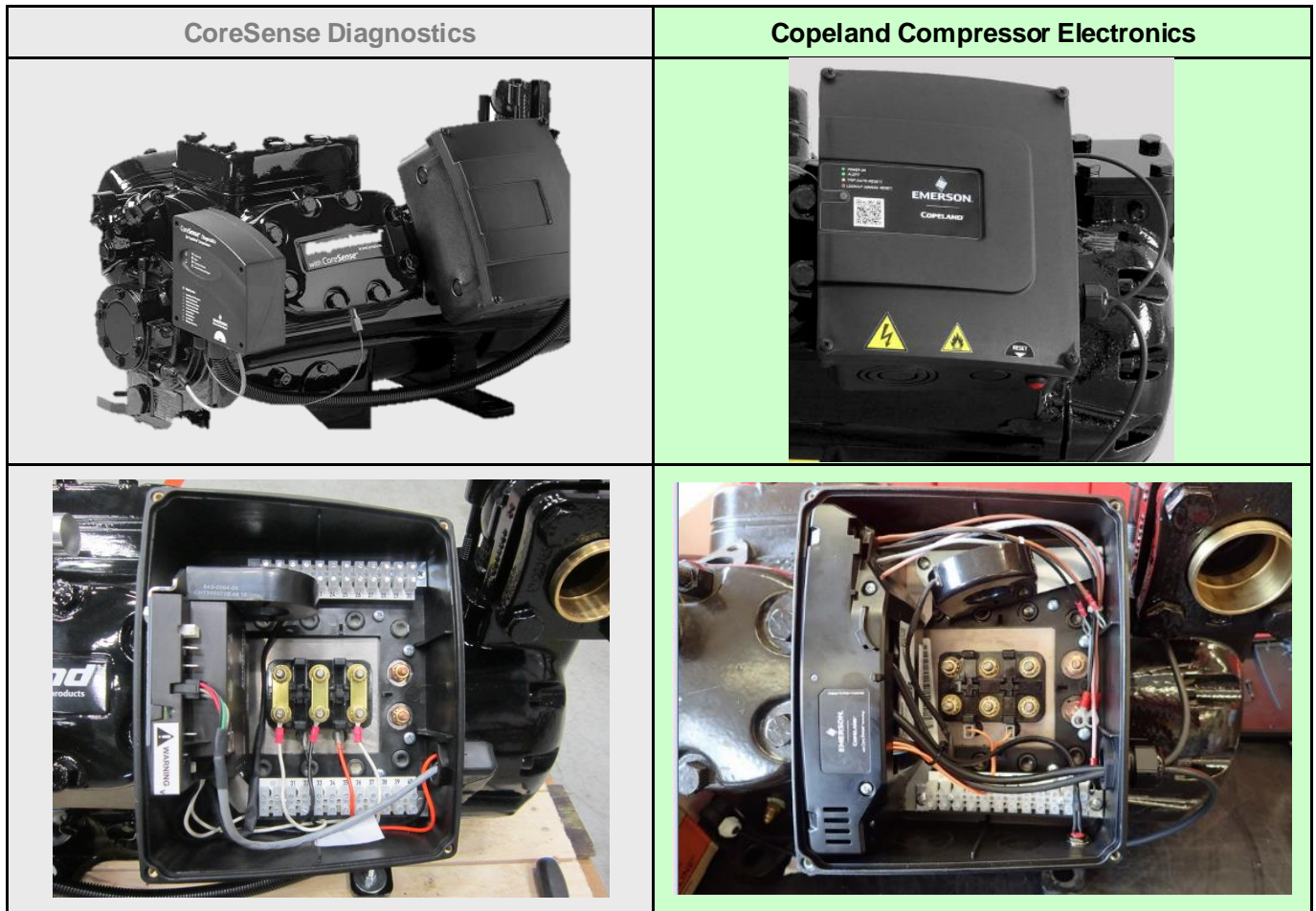
COPELAND™ COMPRESSOR ELECTRONICS FOR COPELAND™ STREAM COMPRESSORS GUIDE FOR THE REPLACEMENT OF CORESENSE™ DIAGNOSTICS

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1 Differences between Copeland™ Compressor Electronics and CoreSense™ Diagnostics

1.1 Location

The Copeland Compressor Electronics (formerly Next Generation CoreSense) module is located in the terminal box of the Stream compressor, whereas the CoreSense Diagnostics module was located outside the terminal box, next to the oil pump. Consequently, the replacement of the CoreSense Diagnostics module with the Copeland Compressor Electronics module will lead to some cabling modifications.



1.2 Sensors and connections

Both modules measure the same type of information, but the sensors can be different or located in different places, and all the connections are different. All the necessary parts are included in the replacement kit.

	CoreSense Diagnostics	Copeland Compressor Electronics
Oil pressure sensor	Sentronic sensor	OPS3 sensor & switch
Discharge temperature sensor	Sensor located in the cylinder head	
	NTC	PT1000
Current sensor	Located in the terminal box	
Sensor module	Located in the terminal box	NO
Modbus connection	Option	Option via an additional module

1.3 Terminal box and cover

The terminal box and its cover have the same dimensions, but they have specific features, so they both need to be replaced.

- The Copeland Compressor Electronics terminal box has one additional hole for the reset button.
- The Copeland Compressor Electronics terminal box cover has a window to allow viewing the LEDs.

2 Replacing CoreSense Diagnostics with Copeland Compressor Electronics and accessories



WARNING

High voltage! Danger of electric shock! Turn off the main power supply to de-energise the compressor before opening the terminal box or undertaking any task on the electrical equipment. Never open the electrical box in rainy weather if the isolating switch is on.

Complete kits for the replacement of CoreSense Diagnostics with Copeland Compressor Electronics can be ordered with the following references:

- Kit for Stream with oil pump: N° 5406738
- Kit for Stream without oil pump (small CO₂ models): N° 3271343

The kits include all the parts needed for the replacement, including the terminal box and its cover.

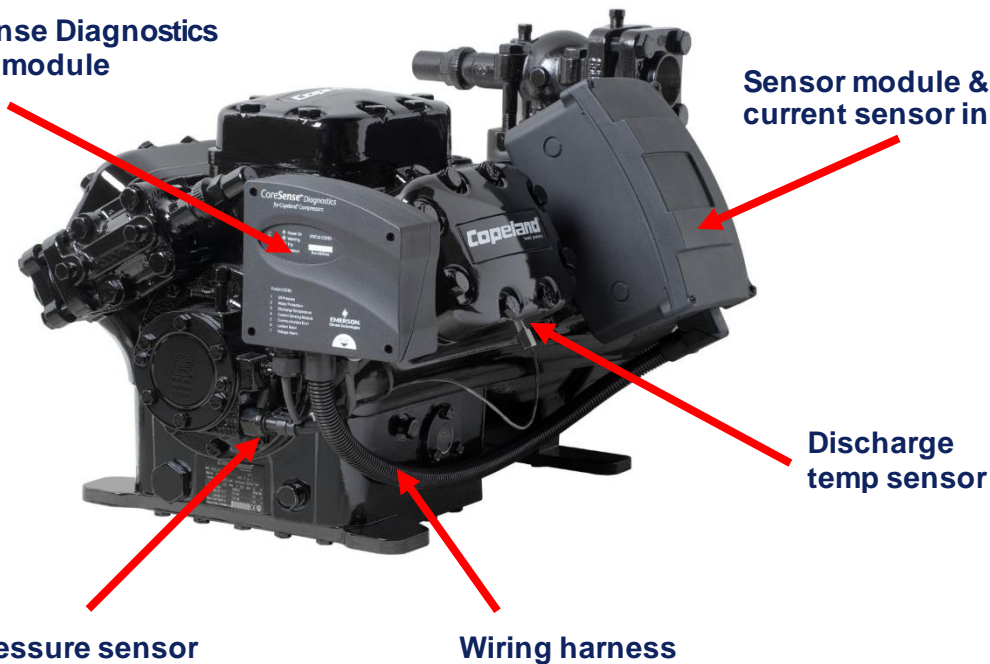
For replacement, parts and components that are not required for the Copeland Compressor Electronics module must be removed and replaced with accessories compatible with the new module.

2.1 Parts to be removed

Parts and components that are specific to the CoreSense Diagnostics module have to be removed.

CoreSense Diagnostics control module

Sensor module & current sensor in T-box



Discharge temp sensor

Oil pressure sensor

Wiring harness

Figure 1: CoreSense Diagnostics module – Main Components

2.1.1 Parts in terminal box

The sensor module with its bracket and the current sensor have to be removed:

- 1) Disconnect the main power supply to the compressor.
- 2) Unscrew the 4 screws located in the corners of the terminal box cover and open the cover.
- 3) Disconnect the power supply to the terminal and the 3 voltage sensing leads attached to the motor terminals and connected to the sensor module.
- 4) Disconnect the power supply to the sensor module and all the other connections (crankcase heater, communication to CoreSense Diagnostics module, current sensor).
- 5) Remove the sensor module and the current sensor.

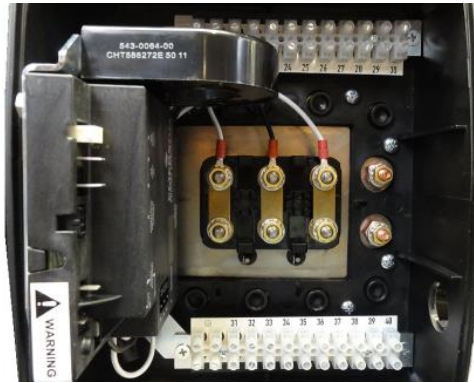


Figure 2: CoreSense Diagnostics sensor module located in terminal box

2.1.2 External parts

- 1) Remove the CoreSense control module with its bracket.
- 2) Remove the cable harness from the terminal box.
- 3) Remove the terminal box.

2.1.3 Sensors in compressor body



CAUTION

Contact with POE! Material damage! POE lubricant must be handled carefully and the proper protective equipment (gloves, eye protection, etc.) must be used at all times. POE must not come into contact with any surface or material that it might damage, including without limitation, certain polymers, eg, PVC/CPVC and polycarbonate.

Both the discharge temperature and the oil pressure differential sensors have to be replaced, which means that the system will have to be opened. Therefore, it is necessary to prepare the compressor according to industry standards first before changing parts.

- 1) Close suction service valve.
- 2) Pump down compressor.
- 3) Disconnect power to compressor.
- 4) Close discharge service valve and oil supply valve (if applicable).
- 5) Depressurize compressor.

NOTE: Once removed the 2 sensors will have to be replaced immediately with the new ones.

2.2 Installation of the Copeland Compressor Electronics module

2.2.1 Replacement of the oil sensor

- 1) Unscrew the existing oil sensor from the oil pump.
- 2) Remove the yellow cap from the new OPS3 oil sensor.
- 3) Fit the new oil sensor in the oil pump with the copper gasket with a tightening torque of 60 to 75 Nm.
- 4) Remove the white cap and screw the electronic switch (black part) to the brass sensor with a tightening torque of maximum 10 Nm.



Figure 3: OPS3 oil pressure sensor and electronic switch

2.2.2 Replacement of the discharge temperature sensor

- 1) Unscrew the discharge sensor from the cylinder head.
- 2) Fit the new discharge temperature sensor in the cylinder head using Loctite or sealing tape on the thread with a tightening torque of 15 Nm.
- 3) Remove the yellow cap and connect the cable to the sensor with a tightening torque of maximum 10 Nm.



Figure 4: Discharge temperature sensor

2.2.3 Replacement of the terminal box

Once the terminal is empty, remove it and replace it with the new terminal box.

2.2.4 Parts in terminal box

The current sensor and the Copeland Compressor Electronics module have to be installed in the terminal box with their own brackets.



Figure 5: Current sensor and Copeland Compressor Electronics module



Figure 6: Terminal box with Copeland Compressor Electronics

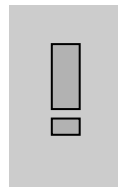
2.2.5 Connections

Once the parts are changed, several cables have to be connected according to the description below.

- Motor PTC cable out of terminals 5 and 6 to S1 and S2 at the terminal plate.
- Current sensor (T1) to terminals 9 and 10 (CM).
- Reset button to terminals 14 and 13 (Reset).
- Discharge gas temperature sensor to terminals 7 and 8 (DGT).
- Oil pressure sensor to terminals 11 and 12 (OPS).
- 2 times 3 cables for each winding, for the phase monitoring to module terminals U1-V1-W1, U2-V2-W2, (PM).
- Earth to PE.
- Power supply (230 or 115 V) to terminals 1 (N) and 2 (L1) (PS), both polarities are possible.
- Crankcase heater to terminals 3 and 4 (CH). Only a crankcase heater with the same power supply as the Copeland Compressor Electronics module (115 or 230 V AC) can be applied.
- Position of jumper according to starting method and motor type.
- Connect the power supply to the terminal plate. **Caution:** the power leads from the same phase should go through the current sensor in the same direction – see T1 (current sensor) on the electrical diagram.
- Connect the control circuit phase (L) to terminal 19.

See the wiring diagrams for more details.

2.2.6 Stream with Copeland Compressor Electronics – Wiring diagrams



IMPORTANT

For Stream CO₂ small and medium compressor models (4MTL-05 to 4MTL-30 & 4MSL-03 to 4MSL-15), the blue positions **1U, 2V, 3W, 7Z, 8X, 9Y** in diagrams below must be considered. The position of the terminals in all the other Stream compressor models corresponds to the black positions. The factory delivery is correct, DO NOT reverse the connections.

Legend

- | | |
|---|---|
| B1 Discharge gas sensor | DGT Discharge gas temperature monitoring |
| B2 Oil level watch (TraxOil) | OW..... Digital oil level watch |
| B3 Oil differential pressure switch (OPS) | OPS Oil differential pressure protection |
| B11..... High-pressure switch | AR..... Alarm relay |
| B12..... Low-pressure switch | DS Run/control signal |
| CTR2 DP Gateway | |
| E1 Heater | CH..... Control oil heater |
| F1,F2,F3 Compressor fuses | PTC..... Motor thermal protection |
| F4, F5 ... Fan fuses | PM Phase monitoring |
| F6..... Module and heater fuse | PS..... Power supply |
| F7..... Control circuit fuse | |
| H1 Diagnosis LED | |
| K11..... Time relay for part-winding (if used) | |
| M2..... Fan motor | |
| Q11 Compressor contactor | Q15 Fan contactor |
| Q12 Compressor contactor Y (if Y/Δ start) | Q13 Compressor contactor Δ (if Y/Δ start) |
| Q14 Compressor contactor 2 nd part-winding (if used) | |
| SB1 Reset button | |
| Y21..... Solenoid valve capacity control 1 | |
| Y22..... Solenoid valve capacity control 2 | |
| T1..... Current sensor | CM Current monitoring |

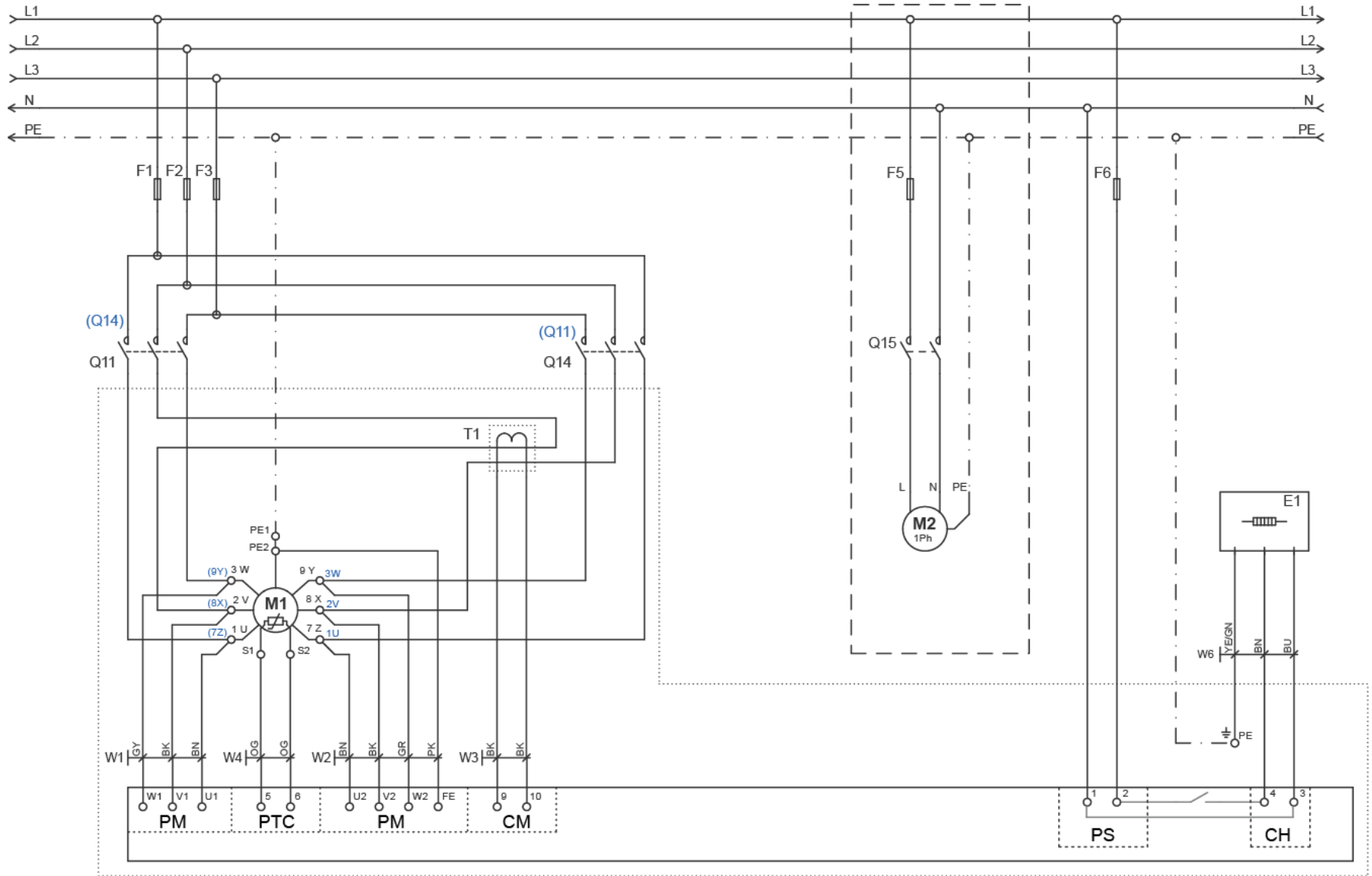


Figure 7: Wiring diagram for AW... motors connected for part-winding start

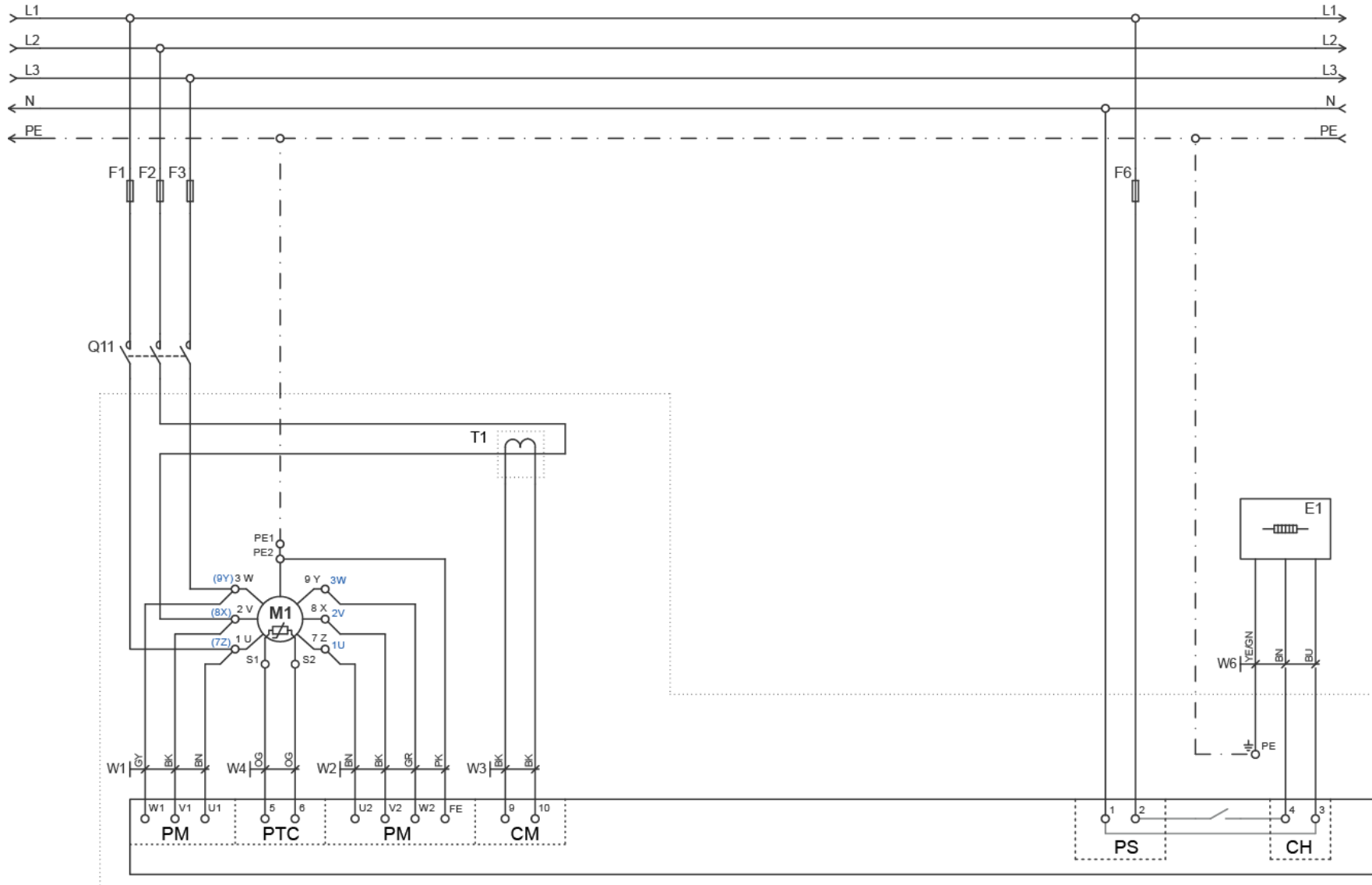


Figure 8: Wiring diagram for Direct Start with part-winding motors (AW...)
 TI_Stream_NGCS_05_EN_Rev03

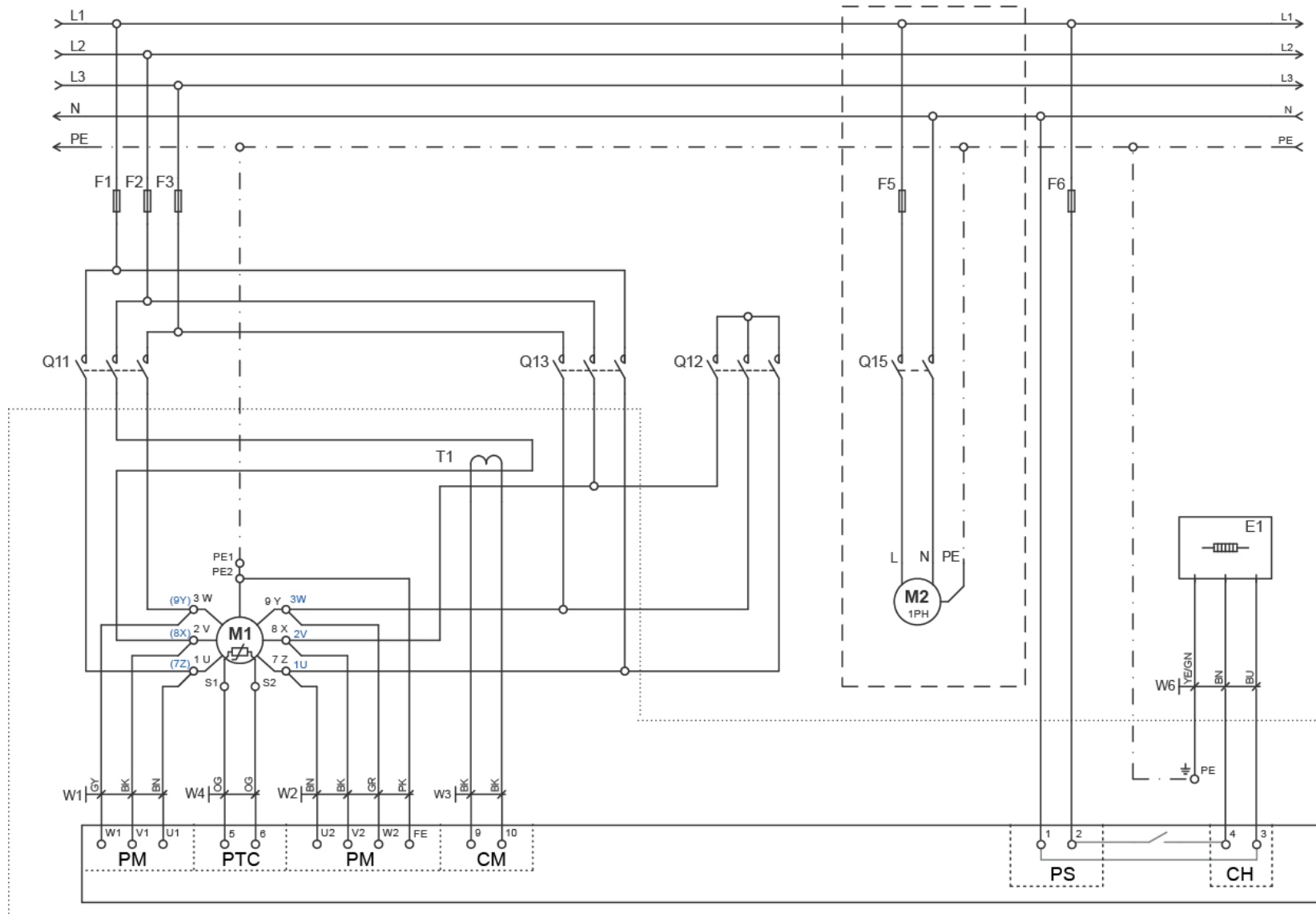


Figure 9: Wiring diagram for Star / Delta motors (EW...)

TI_Stream_NGCS_05_EN_Rev03

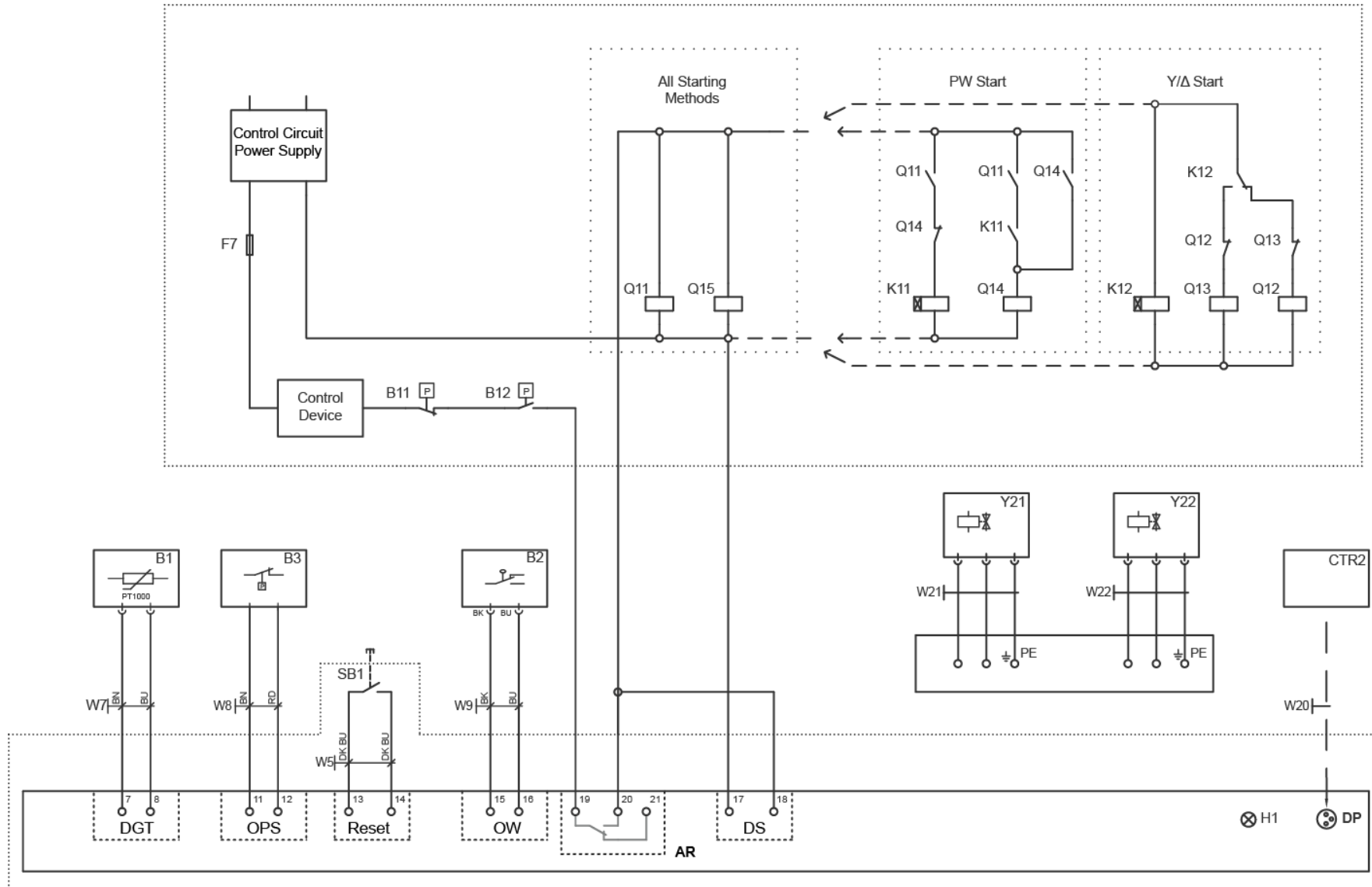


Figure 10: Wiring diagram, control circuit, protections for part-winding and Star / Delta motors (AW... and EW...)

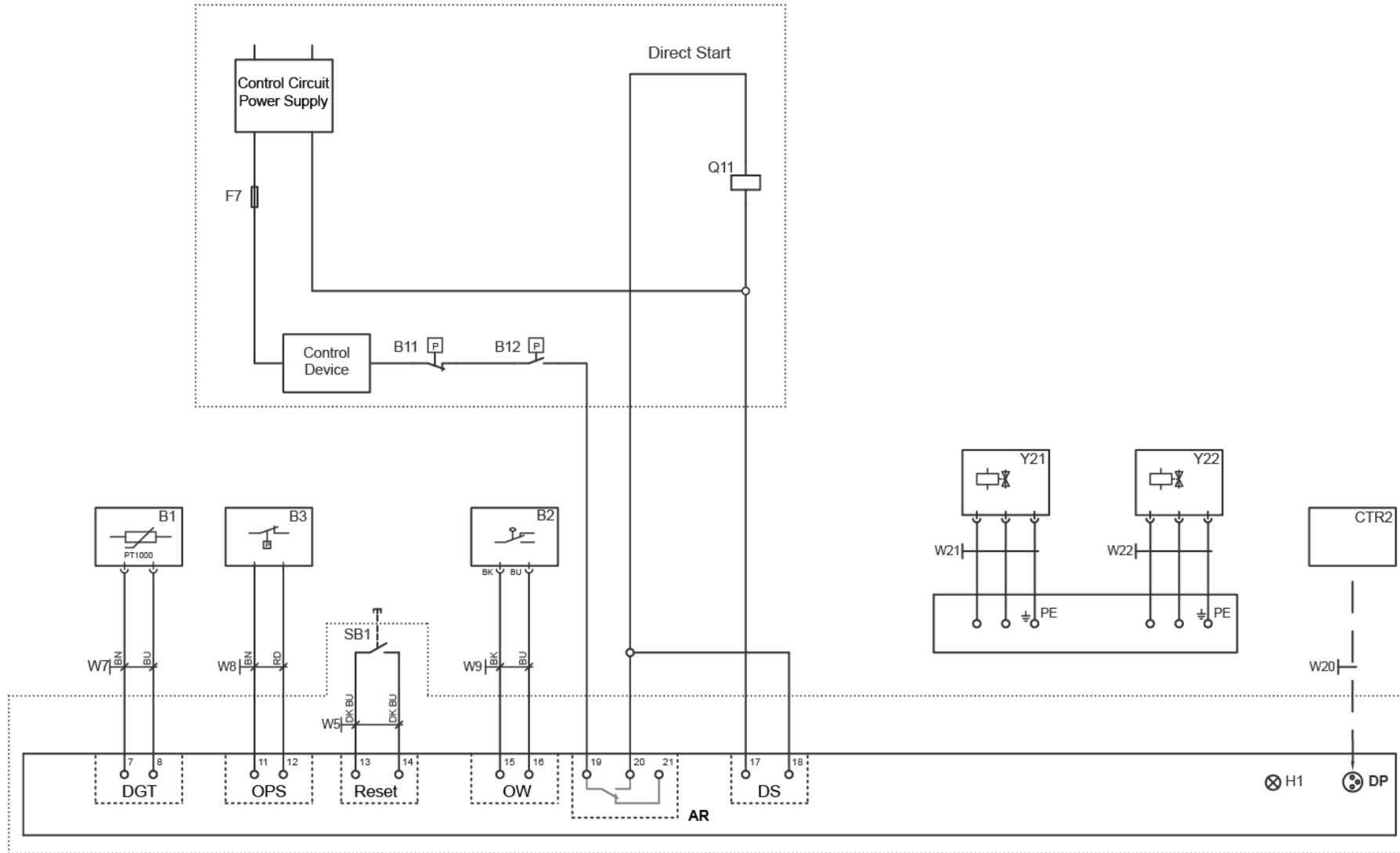


Figure 11: Wiring diagram, control circuit, protections with **Direct Start**

3 Terminal box cover



WARNING

Compressor terminal box cover open! Danger of electric shock! Always ensure that the compressor terminal box cover is properly closed before restarting the unit.

The terminal box must be replaced with the one delivered in the kit to allow viewing the LED indications. The status LEDs in 3 colours (green, orange and red) are visible through the window on the top of the terminal box.



Figure 12: Copeland Compressor Electronics module terminal box with LED indicators and reset button

4 Compressor settings

When a Copeland Compressor Electronics module is delivered for after sales, its configuration is not functional for most compressors. The parameters have to be adjusted according to the compressor model and motor version.

The parameters can be automatically downloaded into the module over USB or Bluetooth gateway via the Copeland Compressor Electronics application.

4.1 System requirements

4.1.1 Application

The app can be downloaded for free from the respective stores or at www.climate.emerson.com/en-gb/tools-resources/mobile-apps. It can be installed on mobile tools with iOS, Android or Windows:

- Android: version 4.4 or higher.
- Apple iOS: version 12.2 or higher.
- Windows: version 10

4.1.2 Connectivity

The Copeland Compressor Electronics mobile app can be connected to the module using DP-USB gateway (not applicable for Apple devices) or Bluetooth gateway.

USB gateway can be used with any computer USB type-A. Adapters USB type-A to USB micro-B and USB-C are delivered to enable connection with Android devices (kit N°5406794). The connection with iOS devices is not possible over USB gateway.

Bluetooth gateway can be used with any device with Bluetooth adapter (kit N° 5406807). It is also the only connection possibility for iOS devices.



Figure 13: USB gateway adapter, N° 5406794



Figure 14: Bluetooth gateway adapter, N° 5406807

4.2 Procedure

- Connect a mobile phone or tablet to the Copeland Compressor Electronics module via USB or Bluetooth gateway (3 pin circular connector in upper right corner of the module).



- Chose "Reset factory settings".
- Insert compressor model or ident and serial numbers.
- Confirm and wait until all parameters are automatically downloaded to the module via the application.

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