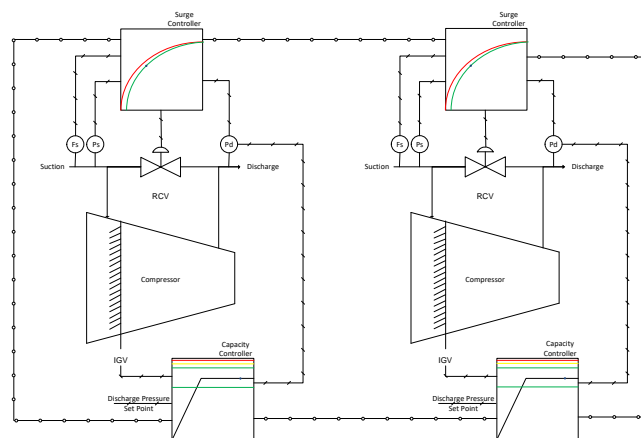




Tri-ASCC Triplicated 4 AntiSurge and Compressor Controller

The TMC SIL Certified Triplicated 4 AntiSurge and Compressor Controller (Tri-ASCC) provides a cost efficient bombproof** solution for Axial, or Radial, Compressors, which can be operated from anywhere, on a plate.



The Tri-ASCC has extremely high availability, 2oo3 Triple Modular Redundant architecture, allowing module replacement and design modifications even with the Compressor on-load.

The TMC Tri-ASCC controls up to 4 Compressor Stages in parallel, series, on separate circuits or a combination.

The Tri-ASCC includes load sharing between Compressor Stages. This load sharing can be extended to multiple Tri-ASCCs over a Peer to Peer*** connection. The TMC Tri-ASCC includes the following features per stage:

Surge Control

- TMC 3D Compressor Map
- Variable Tuning
- Operating Point Shadowing
- Incremental Margin
- Spike Detection
- Incipient Surge Detection (with the addition of a SurgeGard*)

Capacity Control

- Discharge Pressure/Flow/Temperature Control
- Discharge Pressure/Flow/Temperature Limiting
- Suction Pressure/Flow/Temperature Control
- Suction Pressure/Flow/Temperature Limiting

Monitoring

- **Multiple Surge Trip**
- **Surge Alarm**
- **Surge Spike Trip**
- **Incipient Surge Alarm**
- **Discharge Pressure High Alarm**
- **Discharge Pressure High Trip**
- **Suction Pressure Low Alarm**
- **Suction Pressure Low Trip**
- **Recycle Valve Position Deviation alarm**
- **Inlet Guide Vane Position Deviation Alarm**

The TMC Tri-ASCC has the following I/O which can be used for a choice of the following duties:

4 off	16 off	16 off	16 off
4 to 20mA Analogue Outputs	4 to 20mA Analogue Inputs	24VDC 3A Digital Outputs	24VDC Digital Inputs
Recycle Valve 1	Flow 1	Loaded 1 = CC	Load 1 = CC
Recycle Valve 2	Flow 2	Loaded 2 = CC	Load 2 = CC
Recycle Valve 3	Flow 3	Loaded 3 = CC	Load 3 = CC
Recycle Valve 4	Flow 4	Loaded 4 = CC	Load 4 = CC
Blow Off Valve 1	Suction Pressure 1	In Surge 1 = OC	Running 1 = CC
Blow Off Valve 2	Suction Pressure 2	In Surge 2 = OC	Running 2 = CC
Blow Off Valve 3	Suction Pressure 3	In Surge 3 = OC	Running 3 = CC
Blow Off Valve 4	Suction Pressure 4	In Surge 4 = OC	Running 4 = CC
Quench Valve 1	Suction Temperature 1	Alarm 1 = OC	
Quench Valve 2	Suction Temperature 2	Alarm 2 = OC	
Inlet Guide Vanes 1	Suction Temperature 3	Alarm 3 = OC	
Inlet Guide Vanes 2	Suction Temperature 4	Alarm 4 = OC	
Suction Throttle Valve 1	Discharge Pressure 1	Recycle Valve 1 Open = OC	
Suction Throttle Valve 2	Discharge Pressure 2	Recycle Valve 2 Open = OC	
Demand Speed 1	Discharge Pressure 3	Recycle Valve 3 Open = OC	
Demand Speed 2	Discharge Pressure 4	Recycle Valve 4 Open = OC	
Capacity Control PV 1	Discharge Temperature 1		
Capacity Control PV 2	Discharge Temperature 2		
Capacity Control Set Point 1	Discharge Temperature 3		
Capacity Control Set Point 2	Discharge Temperature 4		
Control Curve Distance 1	SurgeGard 1		
Control Curve Distance 2	SurgeGard 2		
Control Curve Distance 3	SurgeGard 3		
	SurgeGard 4		
	Recycle Valve 1 Position		
	Recycle Valve 2 Position		
	Recycle Valve 3 Position		
	Recycle Valve 4 Position		
	Blow Off Valve 1 Position		
	Blow Off Valve 2 Position		
	Blow Off Valve 3 Position		
	Blow Off Valve 4 Position		
	Inlet Guide Vanes 1 Position		
	Inlet Guide Vanes 2 Position		
	Suction Throttle 1 Position		
	Suction Throttle 2 Position		
	Capacity Control PV 1		
	Capacity Control PV 2		
	Capacity Control Set Point 1		
	Capacity Control Set Point 2		
	Valve 1 Override Position		
	Valve 2 Override Position		
	Valve 3 Override Position		
	Valve 4 Override Position		

The same duty can be selected for 2 or more Analogue Outputs for Compressors with valves working in parallel.

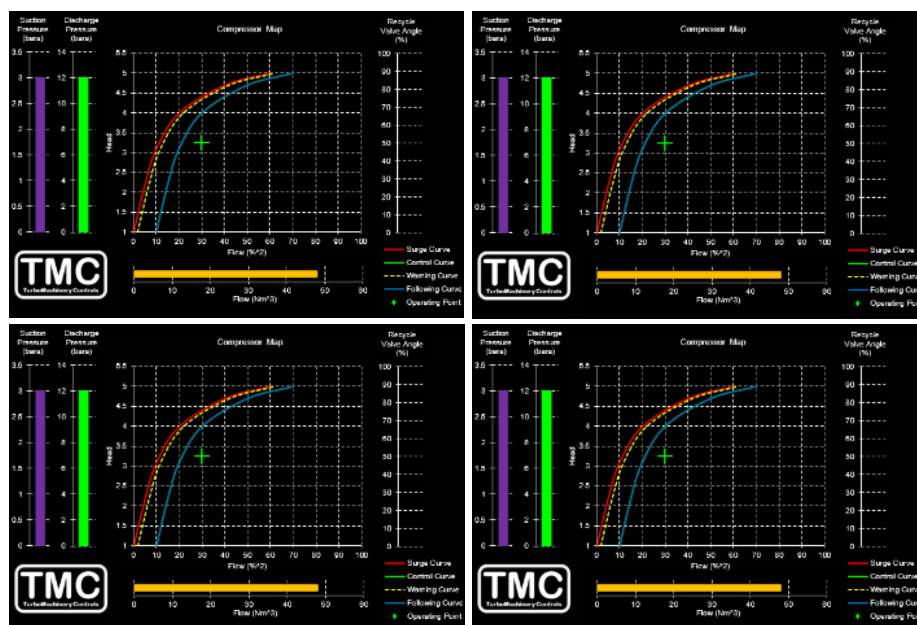
The TMC Tri-ASCC is Safety Integrity Level (SIL) certified to SIL2 or 3. I/O Redundancy is used to achieve SIL loops for the system by assigning multiple I/O points to have the same duty, for example typically:

- A SIL2 Surge control loop requires 2 off Flow Transmitters, 2 off Discharge Pressure Transmitters, 2 off Suction Pressure Transmitters and a SIL2 Tri-ASCC.
- A SIL3 Surge control loop requires 3 off Flow Transmitters, 3 off Discharge Pressure Transmitters, 3 off Suction Pressure Transmitters, 2 off Recycle Valves and a SIL3 Tri-ASCC.

For the Tri-ASCC loop to meet a SIL its complete design including field instrumentation integrity requires consideration. Application specific SIL Studies* are available for the TMC Tri-ASCC.

SIL and non-SIL functions are segregated allowing them to be performed within the same Tri-ASCC. The TMC Tri-ASCC can also be used even when there is no SIL requirement, providing the benefits of 2oo3 availability.

The Tri-ASCC is supplied on a mounting plate designed to be easily retrofitted in to an existing panel. It can be supplied in a range of panels and other types of enclosures*.



The TMC Tri-ASCC is available with a range of Human Machine Interfaces from Lamps, Switches, Dials and Meters* though to PC based SCADA Systems*, DCS systems* and the internet. Remote monitoring is available through an inbuilt HMI web server. The Tri-ASCC can be monitored using any device that has a web browser. The TMC Tri-ASCC can send emails and SMS text messages to inform operators of process critical events. Industrial wireless connections* minimise the time needed for instrument loop checks.

The Tri-ASCC includes First Up Lock Out Trips, a one scan resolution Last Trip Snapshot of Key Parameters and a historic log of the last nine Trips. This information is an invaluable tool to help operators rapidly pinpoint Trip causes, minimising down time.

The Core Control Application Software can be easily modified to control pretty much any Compressor.

The TMC Tri-ASCC is fully flexible and can be expanded with the addition of I/O modules*. Multiple Tri-ASCCs can be Peer to Peer*** connected together to create larger systems.

The TMC Tri-ASCC can accommodate Auxiliary Control*, Emergency Shutdown Systems*, Fire & Gas* and be combined with TMC Tri-STG Core Control Application Software to provide Integrated Train Control for a Steam Turbine Compressor Set*.

Zener Barriers*, Galvanic Isolators*, Interposing Relays* and Position Controllers* can be supplied in addition as required by the application.

Part Number	Description
0016-003	SIL2 Tri-ASCC Triplicated 4 Compressors Control System
0017-003	SIL3 Tri-ASCC Triplicated 4 Compressors Control System
0018-003	HMI-ASCC 15" Panel Mounted Colour Touch Screen

Power Consumption

System Power 33 w at 24 VDC (19.2 to 30.0 VDC)****

Max Field Power 27 w at 24 VDC (19.2 to 30.0 VDC)

Communications

3 off Modbus RTU, RS232 OR RS422, Slave

Communications alternatives are available with the addition of a communications Module*.

Operating Temperature: -20 to 70 DegC****

Relative humidity: 5 to 95% non-condensing****

Dimensions: H 810 mm W 500 mm D 200 mm****

Weight: 22 kg****

For enquiries and further information on Tri-ASCC, STIG or Gas Turbine Control please contact TMC Technical Sales by emailing techsales@turbomachinerycontrols.com.

* Not included in 0016-003, 0017-003 or 0018-003.

** The Tri-ASCC has a high environmental specification and fault tolerance making it virtually bomb proof.

*** Peer to Peer is available with the addition of a Communication Module*.

**** Excluding Human Machine Interface.