

VR10 / VR15 With EtherNet/IP Interface

Operation & Service Manual

EtherNet/IP







Change history:

The change history reflects all changes of the Operation & Service Manual, which were done after the initial release.

Index	Chapters	Change description	Date	Name
001	All	New Release	5-April-2021	MP

This Operation & Service Manual makes no claims of being complete as it does not cover all variants of the VR10 / VR15 valve manifolds.

Therefore, this document is subject to extensions or changes.





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2 ABOUT THIS DOCUMENTATION

This User Guide contains the information to set up and operate VR10 / VR15 valve manifold with EtherNet/IP Interface and to detect and resolve problems.

Note:

In addition to the specific information for the EtherNet/IP variants, all data sheets and VR10 / VR15 PROTOCOL / MULTIPOLE SERIES IP65 VERSION Operation & Service Manual are applicable and remain valid.

Refer also to the data sheets on the following web link:

https://www.norgren.com

Refer also to the valve manifold installation instruction in the following document:

• "VR10 / VR15 PROTOCOL / MULTIPOLE SERIES IP65 VERSION Operation & Service Manual"

This manual can be found on <u>https://www.norgren.com/us/en/technical-support/installation-maintenance-instructions/valves</u>

Basic information about EtherNet/IP could be found in the following documents:

 "Technology Overview Series: EtherNet/IP" <u>https://www.odva.org/wp-content/uploads/2020/05/PUB00138R6-Tech-Series-</u> <u>EtherNetIP.pdf</u>

Network Infrastructure for EtherNet/IP could be found in the following documents:

 "EtherNet/IP Network Infrastructure Guide" <u>https://www.odva.org/wp-</u> <u>content/uploads/2020/05/PUB00035R0 Infrastructure Guide.pdf</u>

Further information about EtherNet/IP is available on following websites:

- https://www.odva.org/
- https://www.odva.org/technology-standards/document-library/





3 IMPORTANT HINTS

3.1 GROUNDING AND EQUIPOTENTIAL BONDING

Proper grounding and equipotential bonding are very important to protect against electromagnetic interferences in EtherNet/IP networks. To reduce potential impact, grounding of the EtherNet/IP cable screen should be done at both ends of every cable (i.e. at each device). Equipotential bonding ensures that the ground potential is identical throughout the entire EtherNet/IP network and is essential to avoid equipotential bonding currents, which could otherwise flow through the EtherNet/IP cable screen. Please refer for further details to the "Network Infrastructure for EtherNet/IP" provided by the EtherNet/IP user organization ODVA (https://www.odva.org/).

For proper grounding please use the earth screw (M4) on the upper side of the valve manifold. For easy reference see item 6 in chapter 4.





4 ELECTRICAL COMPONENTS



1- Port 1 for EtherNet/IP

(M12 x 1 | Female | 4 - pin | D - coded)

2- Port 2 for Ethernet/IP

(M12 x 1 | Female | 4 - pin | D - coded)

- 3- PWR: Power supply connector
 (M12 x 1 | Male | 5 pin | A coded)
- 4- Status LEDs
- 5- IP address switch.
- 6- Earth screw (M4)
- 7- Valve status LEDs





4.1 EtherNet/IP PORT 1 & PORT 2

	M12 / 4 pins /	/ Female Connector / D-coded
	Pin No.	Function
പ്പ	1	Transmission Data + (TD +)
	2	Receive Data + (RD +)
↓ 40 <i>∥</i>	3	Transmission Data - (TD -)
	4	Receive Data - (RD -)

4.2 POWER SUPPLY CONNECTOR

Pin allocating of power supply connector



M12 / 5 pins / Male Connector / A-coded						
Pin No.	Function					
1	L1 (VB +) 24V electronics power supply					
2	N2 (VA -) 0V valves power supply					
3	N1 (VB -) 0V electronics power supply					
4	L2 (VA +) 24V valves power supply					
5	FE (functional earth)					

Power supply connector wiring diagram



Notes:

- Make sure electronics power, valves power and their polarities are connected to correct pins respectively before switching on.
- Select the appropriate cables to mate with the connectors mounted on the control module.
- Connect the earth screw to ground.





4.3 ELECTRICAL DATA

Specification	Remark	
Valve voltage range (VA)	24VDC +10%/-5%	PELV
Electronics voltage range (VB)	24VDC +/-10%	PELV
Maximum currents	VA: n × 40 mA VB: < 100 mA	n = number of solenoids
Voltages are galvanic decoupled	Yes	
Protection against polarity reversal	Yes	
Overcurrent protection VB, VA	Irreversible	
Output polarity	PNP	



5 SOLENOID NUMBER, OUTPUT POINT & VALVE STATION MAPPING 5.1 **MAPPING RULES FOR VALVE STATIONS 12**

If valve stations ≤ 12, 2 solenoid numbers are always reserved for each valve station. * Dotailad allo

Detailed allocation is snown as delow:												
Station	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12
Solenoid A	Sol.01	Sol.03	Sol.05	Sol.07	Sol.09	Sol.11	Sol.13	Sol.15	Sol.17	Sol.19	Sol.21	Sol.23
(14 Solenoid)	Output 0	Output 2	Output 4	Output 6	Output 8	Output 10	Output 12	Output 14	Output 16	Output 18	Output 20	Output 22
Solenoid B	Sol.02	Sol.04	Sol.06	Sol.08	Sol.10	Sol.12	Sol.14	Sol.16	Sol.18	Sol.20	Sol.22	Sol.24
(12 Solenoid)	Output	Output	Output	Output	Output	Output	Output	Output	Output	Output	Output	Output

Notes:

* For valve station with single solenoid, only Solenoid A (14 Solenoid) is connected. Consider the one which is closest to control module as 1st station (Station #1)

5.2 **MAPPING RULES FOR 12 VALVE STATIONS 24**

If $12 < valve stations \le 24$, special rules are required since only 1 solenoid number is allocated to valve station with single solenoid:

Sequence all solenoids following the rules below by starting from 1st station which is the station closest to control module:

- If 1st station is with double solenoids, sequence solenoid A as Sol.01, solenoid B as Sol.02, following 2nd station solenoid A as Sol.03, solenoid B as Sol.04.....
- If 1st station is with single solenoid, sequence solenoid A as Sol.01, following 2nd station solenoid A as Sol.02, solenoid B as Sol.03.....
- o If a station is originally configured as blank, always 2 solenoid numbers are allocated.
- The rest of stations should also adhere to the sequence rules above.
- A 16-station 24 solenoids valve manifold example is shown below:

	Double Solenoids	Double Solenoids	Single Solenoid	Single Solenoid	Double Solenoids	Double Solenoids	Single Solenoid	Double Solenoids	Single Solenoid	Double Solenoids	Single Solenoid	Double Solenoids	Single Solenoid	Single Solenoid	Double Solenoids	Single Solenoid
Station	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15	#16
Solenoid A	Sol.01	Sol.03	Sol.05	Sol.06	Sol.07	Sol.09	Sol.11	Sol.12	Sol.14	Sol.15	Sol.17	Sol.18	Sol.20	Sol.21	Sol.22	Sol.24
(14 Solenoid)	Output 0	Output 2	Output 4	Output 5	Output 6	Output 8	Output 10	Output 11	Output 13	Output 14	Output 16	Output 17	Output 19	Output 20	Output 21	Output 23
Solenoid B	Sol.02	Sol.04			Sol.08	Sol.10		Sol.13		Sol.16		Sol.19			Sol.23	
(12 Solenoid)	Output 1	Output 3		*	Output 7	Output 9	Output 12		Output 15	'	Output 18	*	Output 22	*		

Note:

* For valve station with single solenoid, only Solenoid A (14 Solenoid) is allocated & connected.

Consider the one which is closest to control module as 1st station (Station #1).





6 COMMISSIONING

Notes:

- 1. The method of module installation strongly depends on the configuration software. Please refer to the configuration software manual.
- 2. All examples in this document are made with following tools,

Hardware: Allen-Bradley PLC CPU 1756-L61, Ethernet/IP Module 1756-ENBT.

Software (Rockwell Automation): BootP-DHCP, RS-Linx Classic, RS Logix 5000.

6.1 EDS FILE INSTALLATION

A device description file is needed for configuration of valve manifold. The ESD file is provided by NORGREN and can be downloaded from the following web link:

https://www.norgren.com/us/en/technical-support/software

The EDS (Electronic Data Sheet) file could be used for all variants VR10 / VR15:

"NORGREN-VR1X-EP-Vxx-JJJJMMDD.eds"

Note: "JJJJMMDD" (JJJJ-year, MM-month, DD-day) is date of release, "Vxx" (xx-version number) is version of release.

The EDS file can be installed inside the engineering tool of the EtherNet/IP controller by following steps in RS Logix 5000.:

- Click "Tools" menu.
- Choose "EDS Hardware Installation Tool". Then click on "Next" in Rockwell Automation's EDS wizard window.
- Select "Register an EDS file(s)". Click Next. (Tag 1-2)







- In next window, click on "Register a single file". (Tag 3)
- "Browse" to the source path where EDS file is stored, then click on "Next". (Tag 4-5)

 Click "Next" on the EDS File Installation Test Result window. (Tag 6)









 Click "Next" by accepting the default icon of Norgren valve manifold. (Tag 7)



 Click "Next" on the task summary window. (Tag 8)

Rockwell Automation's EDS Wizard	×
Final Task Summary This is a review of the task you want to complete.	
Vou would like to register the following device . VR1X-EP	
	8
	< Back Next > Cancel





Click Finish. (Tag 9)



 Now the EDS file is added to the engineering tool.





6.2 HARDWARE CONFIGURATION

Note: please create a new project or open an existing project before configuring any hardware.

Please make sure the EtherNet/IP moudle has been configured correctly before add valve manifold moudle in the "Controller Organizer" window in RS Logix 5000 as below.



6.2.1 Add Valve Manifold and Configuration

- Find the EtherNet/IP module in controller Organizer. (Tag 1)
- Right-clicking on "Ethernet". (Tag 2)
- Choose "New Module". (Tag 3)



- In the "Select Module Type" window, filter by key word "Norgren" if too many module types in "Catalog". (Tag 4)
- Select correct module type. (Tag 5)
- Click create. (Tag 6)

Norgren 4	Clear Filters	Show Filters
Catalog Number	Description	Vendor
5]	
<	m	

Construction & Design is subject to change (A1743-OPM-EP / Rev.1)

IMI



 In the "New Module" window, select "General" tab, input Name and IP address. (Tag 7-8)

New Module	Later Holes Type	×
General* Conr	nection Module Info Internet Protocol Port Configura	tion Network
Type:	Ethemet Valve Island VR series VR1X-EP	
Vendor:	Norgren Manufacturing Co., Ltd.	
Parent:	ENBT	
Name:	VR1X_1 7	Ethernet Address
Description:		Private Network: 192.168.1.
	8	IP Address: 192 . 168 . 1 . 11
	*	⊘ Host Name:
Module Defin	nition	
Revision:	1.001	
Electronic K	eying: Compatible Module	
Connections	Exclusive Owner	
	Change	
Status: Creating		OK Cancel Help

- Select "Connection" tab. (Tag 9)
- Set "Requested Packet Interval (RPI)" greater than or equal to 10ms. The RPI times has a direct impact to the busload. (Tag 10)
- Click "OK". (Tag 11)

Note: The lower the cycle times, the higher the busload

New Module				×
General Connection Module Info Internet Protocol	Port Configuration Network			
9 Name	Requested Packet Interval (RPI) (ms)	Connection over EtherNet/IP	Input Trigger	
Exclusive Owner	10.0 ≑ 4.0 - 5000.0	Unicast 🖉	Cyclic	
Trihibit Module Major Fault On Controller If Connection Fails While Module 5m/h	in Run Mode			
Module Fault Status: Creating		11 OK	Cancel	ielp

• Now the valve manifold is added to the tree "Controller Organizer".

🗄 🖷 🔄 I/O Configuration
🚍 📼 1756 Backplane, 1756-A7
🗗 [0] 1756-L61 Demo
🚊 🖞 [1] 1756-ENBT/A ENBT
🗄 🚣 Ethernet
🖞 1756-ENBT/A ENBT
Ethernet Valve Island VR series VR1X_1





6.2.2 Assign IP Address to Valve Manifold

VR10/VR15 provides several options to assign IP address to valve manifold by removing the window to set the rotary and DIP switch with slotted screwdriver 2mm during power off.

The detail functions of the switches are shown as below:







6.2.2.1 IP Address Setting by Remote Control

In remote control mode, IP address can be set by DHCP server, or TCP/IP Interface Object.

 IP address set by DHCP Server VR10/VR15 is set as a DHCP client in remote control mode by default.
 IP Address must be assigned using a DHCP server or a similar tool.
 The IP address must be set again after each power cycle.

The following example shows the IP Address assignment using Rockwell Automations tool BOOTP_DHCP.

In the BOOTP_DHCP tool, making sure network adaptor which is in the network is selected. Then follow the steps below:

- In the "commissioning tool" window, click Add Relation. (Tag 1)
- Enter Client Address (MAC), IP Address and Hostname in the "New Entry" window, Click OK. (Tag 2-3)
- The relation now is added.

le Tools Help		
Add Relation	Discovery History	Clear History
Ethernet Address (New Entry	ostname
	Server IP Address: 192.168.1.254	
	Client Address (MAC): 70-B3-D5-46-80-1E	
	Client IP Address: 192 . 168 . 1 . 11	
,	Hostname: VB1X_1	
Ethernet Address (Description:	ion
	OK 3 Cancel	
Errors and warnings		Relations

- Select the added relation. (Tag 4)
- Click "Enable BOOTP/DHCP". (Tag 5)
- The VR10/VR15 valve manifold will appear with assigned IP Address in "Discovery History" list if address assignment was successful. (Tag 6)

Add Relation		Discovery H	listory		Clear History
Ethernet Address (MAC)	Туре	(hr:min:sec)	#	IP Address	Hostname
70:B3:D5:46:80:1E	DHCP	16:20:08	2	192.168.1.11	VR1X_1 6
Delete Relation		Entered Re	ations	5 Enable BOOTP/DH0	P Disable BOOTP/DHC
Ethernet Address (MAC)	Туре	IP Address		Hostname Des	cription
70:B3:D5:46:80:1E	DHCP	192.168.1.11		VR1X_1	1
				4	1





Static IP Address assignment

Static IP address must be done once and is valid after power cycles.

The following example shows how to set static IP address by Rockwell Automation tool BOOTP/DHCP.

- Click Add Relation. (Tag 1)
- Enter Client Address (MAC), IP Address and Hostname. (Tag 2)
- Click OK. (Tag 3)

0	Select the added relation. (Tag 4)

- Click "Enable BOOTP/DHCP". (Tag 5)
- The VR10/VR15 valve manifold will appear with assigned IP Address in "Discovery History" list if address assignment was successful. (Tag 6)

Add Relation 1	New Entry	Discovery His	hom		
Ethernet Address (New Entry		loiy		Clear History
		prostored a	P Man	stna	ame
	Server	P Address: 192.16	8.1.254		
	Client Add	ess (MAC): 70-83-0)5-46-80-1E		
	Client	P Address: 192	. 168 . 1 . 11	Ľ	
		Hostname: VR1X_	1		
Ethernet Address ([escription:		ion	
		ок 3	Cancel		
Ľ					
					Deletion
rors and warnings nable to service DHCP reque	est from 70:B3:D5	5:46:80:1E.			0 of 256
EtherNet/IP Commission	er - C:\Users\iv	\Desktop\Ethernet	IP Test 20200520\1	bpc	
e Tools Help					
		Discoveru Hi	storu		Clear Histo
Add Relation		01000101111			ciear misic
Add Relation	AAC) Type	(hr:min:sec)	# IP Address	Host	name
Add Relation Ethernet Address (M 70:B3:D5:46:80:1E	MAC) Type DHCP	(hr:min:sec) 16:20:08	# IP Address 2 192.168.1.	Hosti 11 VR1×	
Add Relation Ethernet Address (M 70:B3:D5:46:80:1E	MAC) Type DHCP	[hr:min:sec] 16:20:08	# IP Address 2 192.168.1.	Hosti 11 VR1X	
Add Relation Ethernet Address (M 70:B3:D5:46:80:1E	MAC) Type DHCP	[hr:min:sec] 16:20:08	# IP Address 2 192.168.1.	Hosti 11 VR1×	
Add Relation	MAC) Type DHCP	[hr:min:sec] 16:20:08	# IP Address 2 192.168.1. 5	Hosti 11 VR1×	Liear Histo
Add Relation Ethernet Address [N 70:B3:D5:46:80:1E Delete Relation	MAC) Type DHCP	[hr:min:sec] 16:20:08	IP Address 2 192.168.1. 5 5 ations Enable B001	Hostu 11 VR1×	
Add Relation Ethernet Address (M 70:B3:D5:46:80:1E Delete Relation Ethernet Address (M	(AC) Type DHCP (AC) Type	[hr:min:sec] 16:20:08 Entered Rel	# IP Address 2 192.168.1. 5 ations Enable BOOT Hostname	Hostu I1 VR1X P/DHCP Disa	





- Right-clicking on the relation. (Tag 7)
- Select "Disable BOOTP/DHCP".
- o (Tag 8)
- "[Disable DHCP] command successful" will appear in the Errors and warnings status.

า.	BootP DHCP I	culture our con		1001				- ال	×
	File Tools He	elp							
<u>с</u> р"	Add Relat	tion		Discovery	History			Clear H	listory
CF.	Ethernet A 70:B3:D5:4	ddress (MAC) 16:80:1E) Type DHCP	(hr:min:sec) 10:39:01	# IP 1 19	9 Address 92.168.1.1	1 V	lostname /R1X_1	
EtherNet/IP Co	ommissioner - C	:\Users\jy\Des	ktop\Ether	netIP Test 20)200520\1	1.bpc			×
File Tools He	lp 1							Clear History	
Add Relati	on		Discovery	/ History				Clear mistory	
Ethernet Ac 70:B3:D5:4	idress (MAC) 6:80:1E	Type (h DHCP 16	Discovery r:min:sec 6:21:02	y History 2) # IP 4 19	Address 2.168.1	s	Hostna VR1X_	me 1	
Ethernet Ac 70:B3:D5:4	on Idress (MAC) 6:80:1E on	Type (h DHCP 18	Discovery r:min:sec 5:21:02 Entered	y History 2) # IP 4 19 Relations E	Address 2.168.1	s .11)TP/DHCP	Hostna VR1X_ Disable	me 1 BOOTP/DHCF	
Add Helati Ethernet Ac 70:B3:D5:4 Delete Relati	ddress (MAC) 6:80:1E	Type (h DHCP 16	Discovery r:min:sec 5:21:02 Entered	y History 2) # IP 4 19 Relations E: Http://www.communications.com/initialized	Address 2.168.1 hable BOO	s .11 DTP/DHCP e Descri	Hostna VR1X_ Disable	me 1 BOOTP/DHCF	
Ethernet Ac 70:B3:D5:4 Delete Relati Ethernet Ac 70:B3:D5:4	on idress (MAC) 6:80:1E on idress (MAC) 6:80:1E	Type (h DHCP 16 Type IP DHCP 19	Discovery r:min:sec 5:21:02 Entered I P Address 92.168.1.	y History 2) # IP 4 19 Relations E Htt 11 VF	Address 2.168.1 nable BOO pstname R1X_1	s .11 DTP/DHCP e Descri	Hostna VR1X_ Disable	me 1 BOOTP/DHCF	





• Static IP address can also set by TCP/IP Interface Object.

The Read/Write access to the TCP/IP Interface Object is done via the Explicit Messages communication method.

The configuration method is set up with the bits0-3 in attribute 3. Please use the statically assigned IP configuration set up value "0" for those bits.

Bit(s):	Called:		Definition				
0-3	Configuration Method	Determines how the device shall obtain its IP- related configuration	 0 = The device shall use statically assigned IP configuration values. 1 = The device shall obtain its interface configuration values via BOOTP. * 2 = The device shall obtain its interface configuration values via DHCP. 2 45 - Description for future use. 				
		3-13 = Reserved for fullite use.					
4	DNS Enable	If 1 (TRUE), the devi	If 1 (TRUE), the device shall resolve host names by querying a DNS server.				
5-31	Reserved	Reserved for future u	Reserved for future use and shall be set to zero.				
A 44 11 4 0	(TOD/IDL)						

Attribute 3 of TCP/IP Interface Object: Configuration Method

*IP address of VR10 / VR15 with EtherNet/IP Interface can not be assigned by BOOTP.

Attribute 5 contains the configuration parameters required to operate as a TCP/IP node. At least network address and network mask need to be configured.

Name	Meaning
IP address	The device's IP address.
Network mask	The device's network mask. The network mask is used when the IP network has been partitioned into subnets. The network mask is used to determine whether an IP address is located on another subnet.
Gateway address	The IP address of the device's default gateway. When a destination IP address is on a different subnet, packets are forwarded to the default gateway for routing to the destination subnet.
Name server	The IP address of the primary name server. The name server is used to resolve host names. For example, that might be contained in a CIP connection path.
Name server 2	The IP address of the secondary name server. The secondary name server is used when the primary name server is not available or is unable to resolve a host name.
Domain name	The default domain name. The default domain name is used when resolving host names that are not fully qualified. For example, if the default domain name is "odva.org", and the device needs to resolve a host name of "plc", then the device will attempt to resolve the host name as "plc.adva.org".

Attribute 5 of TCP/IP Interface Object: Interface Configuration





Next table shows the structure of the interface configuration attribute.

Attribute	STRUCT of:	Interface Configuration
	UDSINT	IP Address
	UDSINT	Network Mask
	UDSINT	Gateway Address
5	UDSINT	Name Server
	UDSINT	Name Server 2
	STRING	Domain Name
	UDSINT	Pad

Structure of Attribute 5: Interface Configuration

6.2.2.2 IP Address Set by Dial Panels

When the IP address dial panel is set between 001 and 254, the IP address is set by the dial panel. In this way, the first and second positions of the IP address will remain at 192 and 168, and the last two positions shall be set according to the switch setting instructions in chapter 6.2.2.

6.2.2.3 DHCP Mode

When the IP address dial panel is set to 255 position, IP address setting is in DHCP mode, any static IP address will be cleared automatically, and IP address is set by DHCP server.

Please follow Chapter 6.2.2.1 "a) IP address set by DHCP Server" to set IP address.





6.3 DIGITAL OUTPUTS DATA

In EDS file, the digital outputs data is defined as "Assembly Object Instance: 150d, Class: 0x04".

- VR10 / VR15 valve manifold channel outputs will be real-time monitored & displayed.
- Channel outputs process codes will be reported by "Output Byte 0", "Output Byte 1" and "Output Byte 2".
- The digital outputs data can be found as following capture.
 - Click "Control Tags".
 - Select "Monitor Tags".
 - Expand "VR1X_1:O" and "VR1X_1:O.Data" (VR1X_1 is the name of module; it would change if another name used for the module).

Controller Organizer 🗸 🗸 🗙	Scope: 🗓 Demo 👻 Show: All T	ags			
E Controller Demo	Name 28/4	Value	Force Mask	Stule	Data Tune De:
Controller Tags	+ Counter Beset	l)	{}	Decimal	SINT[3]
Controller Fault Handler	F-Cycle Counting	[]	{}	Decimal	DINT[24]
Power-Up Handler	Bead		,	Decimal	BOOL
	+ BEAD C	[]	[]		MESSAGE
- A Main lask	Beset		(,	Decimal	BOOL
Get Data	+ Beset C	11	[]	D CONTRA	MESSAGE
Inscheduled Programs / Phases	+ VB1X 1:C	[]	{}		0649:EthernetV
Motion Groups	+ VB1X 1:1	[]	{}		0649:EthernetV
Ungrouped Axes	- VB1X 1:0	[]	{}		0649:EthernetV
Add-On Instructions	E-VB1X_1:0 Data	[]	{}	Decimal	SINT[3]
🖃 🚔 Data Types	- VB1X_1:0.Data[0]	,	(,	Decimal	SINT
		0		Decimal	BOOL
🖶 🛲 Strings		0		Decimal	BOOL
🙀 Add-On-Defined	-VB1X 1:0.Data[0].2	0		Decimal	BOOL
🖶 🛄 Predefined		0		Decimal	BOOL
🗄 🖼 Module-Defined		0		Decimal	BOOL
Trends		0		Decimal	BOOL
😑 🔄 I/O Configuration		0		Decimal	BOOL
i⊇		0		Decimal	BOOL
I (1) 1/56-L61 Demo	- VB1X_1:0.Data[1]	0		Decimal	SINT
I [1] I/36-ENBI/A ENBI		0		Decimal	BOOL
		0		Decimal	BOOL
Ethernet Valve Island VP series VP1X 1	-VB1X 1:0.Data[112	0		Decimal	BOOL
		0		Decimal	BOOL
		0		Decimal	BOOL
		0		Decimal	BOOL
		0		Decimal	BOOL
		0		Decimal	BOOL
	- VB1X 1:0.Data[2]	0		Decimal	SINT
	-VB1X 1:0.Data[2].0	0		Decimal	BOOL
		0		Decimal	BOOL
		0		Decimal	BOOL
		0		Decimal	BOOL
		0		Decimal	BOOL
		0		Decimal	BOOL
	-VR1X 1:0.Data[2].6	0		Decimal	BOOL
		0		Decimal	BOOL
4 M	() Wonitor Tage (Edit Tag	- 1			
	Monitor lags V Edit lag:	s /			1





- Outputs Value and solenoid number mapping relation is shown in table below.
 - $\circ~$ The bit is "1" means there is output occurred on that solenoid.
 - $\circ~$ The bit is "0" means no output.
 - $\circ~$ Outputs positioning to valve station follow the mapping rules stated in Chapter 5.

Output Byte 0									
Solenoid	Sol.08	Sol.07	Sol.06	Sol.05	Sol.04	Sol.03	Sol.02	Sol.01	
Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
Value	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	

Output Byte 1									
Solenoid	Sol.16	Sol.15	Sol.14	Sol.13	Sol.12	Sol.11	Sol.10	Sol.09	
Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
Value	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	

Output Byte 2											
Solenoid	Sol.24	Sol.23	Sol.22	Sol.21	Sol.20	Sol.19	Sol.18	Sol.17			
Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0			
Value	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1			





6.4 DIGITAL INPUTS DATA

In EDS file, the digital inputs data is defined as "Assembly Object Instance: 100d, Class: 0x04".

The digital inputs data reflect diagnostic status, it includes 4 parts:

- 1) Overall status diagnostics
- 2) Short circuit diagnostics per solenoid
- 3) Open load diagnostics per solenoid (e.g. wire break of solenoid)
- 4) Cycle overrun diagnostics per solenoid (cycles beyond the count limit)

The digital inputs data can be found as following capture.

- Click "Control Tags". (Tag 1)
- Select "Monitor Tags". (Tag 2)
- Expand "VR1X_1: I" and "VR1X_1:I.Data" (VR1X_1 is the name of module, it would change if another name used for the module). (Tag 3)







• The diagnostic status and digital inputs data mapping shows in following table:

Overall				Inpu	it Byte 0						
status	Fault type		OC	SC	COR	UV-VB	OV-VB	UV-VA	OV-VA		
ulagnostics	Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
	Input Byte 1										
	Solenoid	Sol.08	Sol.07	Sol.06	Sol.05	Sol.04	Sol.03	Sol.02	Sol.01		
	Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
Short				Inpu	it Byte 2						
CIRCUIT	Solenoid	Sol.16	Sol.15	Sol.14	Sol.13	Sol.12	Sol.11	Sol.10	Sol.09		
ulagnostics	Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
				Inpu	it Byte 3						
	Solenoid	Sol.24	Sol.23	Sol.22	Sol.21	Sol.20	Sol.19	Sol.18	Sol.17		
	Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
				Inpu	it Byte 4						
	Solenoid	Sol.08	Sol.07	Sol.06	Sol.05	Sol.04	Sol.03	Sol.02	Sol.01		
	Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
Open load				Inpu	it Byte 5						
diagnostics	Solenoid	Sol.16	Sol.15	Sol.14	Sol.13	Sol.12	Sol.11	Sol.10	Sol.09		
	Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
				Inpu	it Byte 6						
	Solenoid	Sol.24	Sol.23	Sol.22	Sol.21	Sol.20	Sol.19	Sol.18	Sol.17		
	Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
				Inpu	it Byte 7						
	Solenoid	Sol.08	Sol.07	Sol.06	Sol.05	Sol.04	Sol.03	Sol.02	Sol.01		
	Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
Cycle				Inpu	it Byte 8						
overrun	Solenoid	Sol.16	Sol.15	Sol.14	Sol.13	Sol.12	Sol.11	Sol.10	Sol.09		
	Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
				Inpu	it Byte 9						
	Solenoid	Sol.24	Sol.23	Sol.22	Sol.21	Sol.20	Sol.19	Sol.18	Sol.17		
	Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		



6.4.1 Overall Status Diagnostics

- VR10 / VR15 valve manifold module status will be shown in real-time.
- The overall status diagnostic includes:
 - Over voltage diagnostics for valve power
 - Under voltage diagnostics for valve power
 - Over voltage diagnostics for electronic power
 - Under voltage diagnostics for electronic power
 - o Cycle overrun overall diagnostics (cycles beyond the count limit)
 - o Short circuit overall diagnostics
 - Open load overall diagnostics (e.g. wire break of solenoid)
- Fault error will be reported by "Input Byte 0".

RSLogix 5000 - Demo [1756-L61 20.19] - [Controller Tags	- Demo(co	ontroller)]							
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🖃 🔄 Controller Demo		Name -==[/	Value	Force Mark	Stule	Data Turpe	Description	Constar	nt I
🖉 Controller Tags		T Counter Beset	/ value	FOICE Mask	Decimal	SINT[3]	Description	Constar	R.
Controller Fault Handler		E Cycle Counting	()	1)	Decimal	DINT[24]			
Power-Up Handler		Bead	0		Decimal	BOOL			
- Tasks		+ BEAD C	[]	[]		MESSAGE			
MainProgram		Reset	0		Decimal	BOOL			
Get Data		+ Reset C	{}	{}		MESSAGE			
Unscheduled Programs / Phases		+ VR1X 1:C	{}	{}		0649:EthernefV			
Motion Groups		E-VR1X_1:I	{}	{}		0649:EthernetV			
Ungrouped Axes		-VR1X_1:I.ConnectionFaulted	0		Decimal	BOOL			
		E-VR1X_1:I.Data	{}	{}	Decimal	SINT[10]			
🚊 🔄 Data Types		-VR1X_1:I.Data[0]	0		Decimal	SINT			
📲 User-Defined			0		Decimal	BOOL			
👜 🚛 Strings			0		Decimal	BOOL			
Add-On-Defined			0		Decimal	BOOL			
🔋 🛄 Predefined			0		Decimal	BOOL			
Generation Module-Defined			0		Decimal	BOOL			
Trends			0		Decimal	BOOL			
			0		Decimal	BOOL			
		VR1X_1:I.Data[0].7	0		Decimal	BOOL			
1111756_ENRT/A ENRT		+ VR1X_1:I.Data[1]	0		Decimal	SINT			
Ethernet		+ VR1X_1:I.Data[2]	0		Decimal	SINT			
1756-ENRT/A ENRT		VR1X_1:I.Data[3]	0		Decimal	SINT			
Ethernet Valve Island VR series VR1X 1		UR1X_1:I.Data[4]	0		Decimal	SINT			
		+ VR1X_1:I.Data[5]	0		Decimal	SINT		-	
		+ VR1X_1:I.Data[6]	0		Decimal	SINT		-	
		VR1X_1:I.Data[7]	0		Decimal	SINT			
		TVR1X_1:I.Data[8]	0		Decimal	SINT			
		E-VR1X_1:I.Data[9]	0		Decimal	SINT			
		±-VR1X_1:0	{}	{}		_0649:EthernetV			





• Common fault errors are shown below:

Fault type	Associated	LED & Remark
Over voltage diagnostics for valve power	"VA" LED, red	
Abbreviation: OV-VA		2 9 5 x 100 x 10 x 1 SETTINGS
Under voltage diagnostics for valve power		EtherNet/IP
Abbreviation: UV-VA	VA LED, liasning red	Y Image: Constraint of the second seco
Over voltage diagnostics for electronic power		
Abbreviation: OV-VB	VB LED, red	2 5 z × 100 × 10 × 1 SETTINGS
Under voltage diagnostics for electronic power		
Abbreviation: UV-VB	VB LED, hashing red	2 5 z × 100 × 10 × 1 SETTINGS
Cycle overrun diagnostics		EtherNet/IP
Abbreviation: COR	"MS" LED, flashing red	2 5 6° X100 X16 X1 58713465
Short circuit diagnostics		EtherNet/IP
Abbreviation: SC	"MS" LED, flashing red	2 5 6° X100 X16 X1 SETTINGS
Open load diagnostics		EtherNet/IP
Abbreviation: OC	"MS" LED, flashing red	Need to enable open load
		diagnostics

 Binary code and fault type mapping relation is shown in table below. 0 is no fault, 1 is fault found.

Input Byte 0											
Fault type		OC	SC	COR	UV-VB	OV-VB	UV-VA	OV-VA			
Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0			
Value	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1			





6.4.2 Short Circuit Diagnostics

Short circuit fault error codes will be reported by "Input Byte 1", "Input Byte 2" and "Input Byte 3".

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Controller Fault Handler	+ Cycle Counting	{}	{} Decimal	DINT[24]
- Power-up Handler	Read	0	Decimal	BOOL
A MainTask	±-READ_C	{}	{}	MESSAGE
MainProgram	Reset	0	Decimal	BOOL
⊕ 🕞 Get_Data		{}	{}	MESSAGE
Unscheduled Programs / Phases	T-VR1X_1:C	{}	{}	_0649:EthernetV
🖶 🖶 Motion Groups	E-VB1X_1:1	{}	{}	_0649:EthernetV
Ungrouped Axes		0	Decimal	BOOL
		{}	{} Decimal	SINT[10]
😑 🗠 🔂 Data Types		0	Decimal	SINT
User-Defined		0	Decimal	SINT
Add On Defined		0	Decimal	BOOL
Predefined		0	Decimal	BOOL
Module-Defined		0	Decimal	BOOL
Trends		0	Decimal	BOOL
🗐 🔄 I/O Configuration		0	Decimal	BOOL
🗄 📾 1756 Backplane, 1756-A7		0	Decimal	BUUL
🔤 [0] 1756-L61 Demo		0	Decimal	BUUL
🚊 🖞 [1] 1756-ENBT/A ENBT		0	Decimal	BUUL
Ethernet		0	Decimal	SINT
1756-ENBT/A ENBT	VRTX_11LData[2].0	0	Decimal	BUUL
Ethernet Valve Island VR series VR1X_1	VRIA_DLData[2].1	0	Decimal	BOOL
		0	Decimal	POOL
	-VP1V_11Data[2].5	0	Decimal	BOOL
		0	Decimal	BOOL
	-VB1X_1:LData[2].6	0	Decimal	BOOL
	-VB1X 1:LData[2].7	0	Decimal	BOOL
	- VR1X 1:I.Data[3]	0	Decimal	SINT
	-VR1X 1:I.Data[3].0	0	Decimal	BOOL
	-VR1X 1:I.Data[3].1	0	Decimal	BOOL
	-VR1X 1:I.Data[3].2	0	Decimal	BOOL
		0	Decimal	BOOL
		0	Decimal	BOOL
		0	Decimal	BOOL
		0	Decimal	BOOL
		0	Decimal	BOOL
		0	Decimal	SINT
		0	Decimal	SINT
	• VR1X_1:I.Data[6]	0	Decimal	SINT
< III. ►	A Nonitor Tags / Edit Tags			•





 Binary code and solenoid number mapping relation is shown in table below. 0 is no fault, 1 is fault found.

Input Byte 1											
Solenoid	Sol.08	Sol.07	Sol.06	Sol.05	Sol.04	Sol.03	Sol.02	Sol.01			
Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0			
Value	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0/1	0/1			

Input Byte 2											
Solenoid	Sol.16	Sol.15	Sol.14	Sol.13	Sol.12	Sol.11	Sol.10	Sol.09			
Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0			
Value	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1			

Input Byte 3											
Solenoid	Sol.24	Sol.23	Sol.22	Sol.21	Sol.20	Sol.19	Sol.18	Sol.17			
Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0			
Value	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1			





6.4.3 Open Load Diagnostics

Open load fault error codes will be reported by "Input Byte 4", "Input Byte 5" and "Input Byte 6".

Note: Need to enable open load diagnostics.

👸 RSLogix 5000 - Demo [1756-L61 20.19] - [Controller Tags - Der	mo(controller)]				
File Edit View Search Logic Communications Too	ls Window Help	1			
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Controller Tags	Beset	1000	1 CICC MILLION	Decimal BOOI	
Controller Fault Handler	+ Beset C	[]	[]	MESSAGE	
Power-Up Handler	F VB1X 1:C	{}	{}	0649:Ethern	netV
- A lasks	E-VB1X 1:L	{}	{}	0649:Ethern	ietV
	VB1X 1:1.ConnectionFaulted	0		Decimal BOOL	
B Get Data	E-VR1X 1:LData	{}	{}	Decimal SINT[10]	
Unscheduled Programs / Phases	+-VB1X 1:1.Data[0]	0		Decimal SINT	
A Motion Groups	+-VB1X_1:I.Data[1]	0		Decimal SINT	
Ungrouped Axes	T VR1X_1:I.Data[2]	0		Decimal SINT	
Add-On Instructions	THE TRIX_1:I.Data[3]	0		Decimal SINT	
🖕 📇 Data Types	-VB1X_1:I.Data[4]	0		Decimal SINT	
	-VR1X_1:I.Data[4].0	0		Decimal BOOL	
🖶 🙀 Strings		0		Decimal BOOL	
Add-On-Defined		0		Decimal BOOL	
🗈 🛶 Predefined		0		Decimal BOOL	
Module-Defined		0		Decimal BOOL	
		0		Decimal BOOL	
1756 Packalana 1756 A7		0		Decimal BOOL	
	VB1X_1:I.Data[4].7	0		Decimal BOOL	
1111756-ENBT/A ENBT		0		Decimal SINT	
Ethernet		0		Decimal BOOL	
1756-ENBT/A ENBT		0		Decimal BOOL	
Ethernet Valve Island VR series VR1X_1		0		Decimal BOOL	
		0		Decimal BOOL	
		0		Decimal BOOL	
		0		Decimal BOOL	
		0		Decimal BOOL	
		0		Decimal BOOL	
	- VR1X_1:I.Data[6]	0		Decimal SINT	
		0		Decimal BOOL	
		0		Decimal BOOL	
		0		Decimal BOOL	
		0		Decimal BOOL	
		0		Decimal BOOL	
		0		Decimal BOOL	
		0		Decimal BOOL	
	VR1X_1:I.Data[6].7	0		Decimal BOOL	
	+-VR1X_1:I.Data[7]	0		Decimal SINT	
	+ VR1X_1:I.Data[8]	0		Decimal SINT	
	+-VR1X_1:I.Data[9]	0		Decimal SINT	
	± VR1X_1:0	{}	{}	_0649:Ethern	ietV
۰ III +	Monitor Tags / Edit Tags	:/		٠	





 Binary code and solenoid number mapping relation is shown in table below. 0 is no fault, 1 is fault found.

Input Byte 4											
Solenoid	Sol.08	Sol.07	Sol.06	Sol.05	Sol.04	Sol.03	Sol.02	Sol.01			
Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0			
Value	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0/1	0/1			

Input Byte 5											
Solenoid	Sol.16	Sol.15	Sol.14	Sol.13	Sol.12	Sol.11	Sol.10	Sol.09			
Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0			
Value	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1			

Input Byte 6										
Solenoid	Sol.24	Sol.23	Sol.22	Sol.21	Sol.20	Sol.19	Sol.18	Sol.17		
Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
Value	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1		





6.4.4 Cycle Overrun Diagnostics

Cycle overrun fault error codes will be reported by "Input Byte 7", "Input Byte 8" and "Input Byte 9".

Note: Need to set valid count limit so that this diagnostic function is effective.

😰 RSLogix 5000 - Demo [1756-L61 20.19] - [Controller Tags - Dem	o(controller)]			
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Redundancy	avorites 🖌 Add-On 👗 Safety 👗 Alarms 👗	Bit 🔏 Timer/C		
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		1	11	0649:EthernetV
	VB1X_1:1 ConnectionEaulted		11	Decimal BDDI
Gat Data	-VB1X_11Data	I	11	Decimal SINT[10]
Unscheduled Programs / Phases	T-VB1X_11Data[0]		,,	Decimal SINT
Motion Groups	+-VB1X 11 Data[1]	0		Decimal SINT
Ungrouped Axes	T-VB1X 11 Data[2]	0		Decimal SINT
Add-On Instructions	+ VB1X 1:I.Data[3]	0		Decimal SINT
🖻 📇 Data Types	+ VB1X 1:I.Data[4]	0		Decimal SINT
📲 User-Defined	+ VB1X 1:1.Data[5]	0		Decimal SINT
🖶 🚋 Strings	+ VB1X 1:I.Data[6]	0		Decimal SINT
	- VB1X 1:I.Data[7]	0		Decimal SINT
🖶 🔙 Predefined	-VB1X 1:LData[7].0	0		Decimal BOOL
🗄 🔙 Module-Defined		0		Decimal BOOL
Trends		0		Decimal BOOL
E. S I/O Configuration	VB1X 1:I.Data[7].3	0		Decimal BOOL
□		- 0		Decimal BOOL
[0] 1/56-L61 Demo [1] (1) 1756-L61 Demo		0		Decimal BOOL
		- 0		Decimal BOOL
		0		Decimal BOOL
Fthernet Valve Island VR series VR1X 1		0		Decimal SINT
Enerice valve Bland Virsenes View_1		0		Decimal BOOL
		0		Decimal BOOL
		0		Decimal BOOL
		0		Decimal BOOL
		0		Decimal BOOL
		0		Decimal BOOL
		0		Decimal BOOL
		0		Decimal BOOL
	-VB1X 1:I.Data[9]	0		Decimal SINT
	VR1X 1:I.Data[9].0	0		Decimal BOOL
		0		Decimal BOOL
		0		Decimal BOOL
		0		Decimal BOOL
		0		Decimal BOOL
		0		Decimal BOOL
		0		Decimal BOOL
		0		Decimal BOOL
		{}	{}	_0649:EthernetV
< >	Monitor Tags Edit Tags	1		•





 Binary code and solenoid number mapping relation is shown in table below. 0 is no fault, 1 is fault found.

Input Byte 7										
Solenoid	Sol.08	Sol.07	Sol.06	Sol.05	Sol.04	Sol.03	Sol.02	Sol.01		
Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
Value	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1		

Input Byte 8										
Solenoid	Sol.16	Sol.15	Sol.14	Sol.13	Sol.12	Sol.11	Sol.10	Sol.09		
Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
Value	0 / 1	0/1	0/1	0/1	0/1	0/1	0 / 1	0/1		

Input Byte 9										
Solenoid	Sol.24	Sol.23	Sol.22	Sol.21	Sol.20	Sol.19	Sol.18	Sol.17		
Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
Value	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1		





6.5 PARAMETERIZATION

In EDS file, the parameterization data is defined as "Assembly Object Instance: 151d, Class: 0x04". All the parameterization data must be downloaded after setting.

6.5.1 Cycle Counter Limit

It is possible for VR10 / VR15 valve manifold to set cycle counter limit for each solenoid. If count exceeds limit, MS LED on the valve manifold change from green to red flashing.

- Click "Control Tags". (Tag 1)
- Select "Monitor Tag". (Tag 2)
- Expand the "VR1X_1:C" (VR1X_1 is the name of module; it would change if another name used for the module). (Tag 3)
- Set the counter limit value for each solenoid. The default value for each solenoid is 16#ffff_fff (HEX Style), the maximum limit value. (Tag 4)



Name	18	Value 🔸	Force Mask 🛛 🔦	Style	Data Type
E-VR1X_1:C		{}	{}		_0649:EthernetV
VR1X_1:C.Cycle_Counter	Limit1	16#ffff_fff		Hex 👻	DINT
THE STATE OF	_Limit2	2#1111_1111_1111_1111_1111		Binary	DINT
⊕-VR1X_1:C.Cycle_Counter	_Limit3	2#1111_1111_1111_1111_1111		Binary	DINT
⊕-VR1X_1:C.Cycle_Counter	_Limit4	2#1111_1111_1111_1111_1111		Binary	DINT
THE TRIX_1:C.Cycle_Counter	_Limit5	2#1111_1111_1111_1111_1111		Binary	DINT





- Variable name and solenoid number mapping relation is shown in table below.
- The range of counter limit for each solenoid between 16#0000_0000 and 16#ffff_ffff.
- Solenoid number and output point mapping relation is shown in Chapter 5.

cle Count Limit Mapp	ing
Solenoid	Value Range
Sol.01	16#0000_0000 ~ 16#ffff_ffff
Sol.02	16#0000_0000 ~ 16#ffff_ffff
Sol.03	16#0000_0000 ~ 16#ffff_ffff
Sol.04	16#0000_0000 ~ 16#ffff_ffff
Sol.05	16#0000_0000 ~ 16#ffff_ffff
Sol.06	16#0000_0000 ~ 16#ffff_ffff
Sol.07	16#0000_0000 ~ 16#ffff_ffff
Sol.08	16#0000_0000 ~ 16#ffff_ffff
Sol.09	16#0000_0000 ~ 16#ffff_ffff
Sol.10	16#0000_0000 ~ 16#ffff_ffff
Sol.11	16#0000_0000 ~ 16#ffff_ffff
Sol.12	16#0000_0000 ~ 16#ffff_ffff
Sol.13	16#0000_0000 ~ 16#ffff_ffff
Sol.14	16#0000_0000 ~ 16#ffff_ffff
Sol.15	16#0000_0000 ~ 16#ffff_ffff
Sol.16	16#0000_0000 ~ 16#ffff_ffff
Sol.17	16#0000_0000 ~ 16#ffff_ffff
Sol.18	16#0000_0000 ~ 16#ffff_ffff
Sol.19	16#0000_0000 ~ 16#ffff_ffff
Sol.20	16#0000_0000 ~ 16#ffff_ffff
Sol.21	16#0000_0000 ~ 16#ffff_ffff
Sol.22	16#0000_0000 ~ 16#ffff_ffff
Sol.23	16#0000_0000 ~ 16#ffff_ffff
Sol.24	16#0000_0000 ~ 16#ffff_ffff
	Solenoid Solenoid Sol.01 Sol.02 Sol.03 Sol.04 Sol.05 Sol.06 Sol.07 Sol.08 Sol.09 Sol.10 Sol.10 Sol.11 Sol.12 Sol.13 Sol.14 Sol.15 Sol.16 Sol.17 Sol.18 Sol.19 Sol.20 Sol.21 Sol.22 Sol.23 Sol.23





6.5.2 Open Load Diagnostics Setting

It is possible for VR10 / VR15 valve manifold to enable / disable the open load diagnostics for each solenoid. If disabled, no EtherNet/IP open load diagnostic error appears. Otherwise MS LED on the valve manifold change from green to red flashing.

- Click "Control Tags". (Tag 1)
- Select "Monitor Tag". (Tag 2)
- Expand the "VR1X_1:C" (VR1X_1 is the name of module; it would change if another name used for the module). (Tag 3)
- Set "0" or "1" for each solenoid to enable or disable open load diagnostics function. The default value for each solenoid is "0", it means open load diagnostic is disabled as default. (Tag 4)

RSLogix 5000 - Demo [1756-L61 20.19]* - [Controller Tags - Dem	no(controller)]					
File Edit View Search Logic Communications Tools	Window Help					
			a			Offline
	▼ #* * <u>*</u> ₩ LE L' H' ≪	Q Select a Language	<u>~</u>	10 11 71	() (0) (c)	
Offline 🛛 🗸 🗖 RUN 👘 🚺 Path	: <none></none>	▼ 品 % % /4 % %	H			No Edits
No Forces						Path:" <none></none>
No Edits 🔒 🗖 Ko	H_ H_ + + +/+ -()(L)(U)- ONS (DSR 🕨				
Redundancy 5.0	Favorites 🖌 Add-On 🖌 Safety 👗 Alarms 🔪 Bit	Timer/C				
	Scope: 🗊 Demo 👻 Show: All Tags					•
Controller Jags	Name == A	Value 🗲	Force Mask 🗧 🕈	Style	Data Type	Description
Controller Fault Handler	VR1X_1:C.Cycle_Counter_Limit17	2#1111_1111_1111_1111_1111		Binary	DINT	
Power-Up Handler	VR1X_1:C.Cycle_Counter_Limit18	2#1111_1111_1111_1111_1111		Binary	DINT	
🖃 🕞 Tasks	THE TRIX_1:C.Cycle_Counter_Limit19	2#1111_1111_1111_1111_1111		Binary	DINT	
🖕 🙀 MainTask	VR1X_1:C.Cycle_Counter_Limit20	2#1111_1111_1111_1111_1111		Binary	DINT	
🖶 🚔 MainProgram	VR1X_1:C.Cycle_Counter_Limit21	2#1111_1111_1111_1111_1111		Binary	DINT	
👜 🚔 Get_Data	VR1X_1:C.Cycle_Counter_Limit22	2#1111_1111_1111_1111_1111		Binary	DINT	
Unscheduled Programs / Phases	VR1X_1:C.Cycle_Counter_Limit23	2#1111_1111_1111_1111_1111		Binary	DINT	
in the matter of	The second	2#1111_1111_1111_1111_1111		Binary	DINT	
Ungrouped Axes 3	VR1X_1:C.Open_Load_Diagnostics1	2#0000_0001		Binary	SINT	
Add-On Instructions	VR1X_1:C.Open_Load_Diagnostics1.0	[1]	4	Decimal	BOOL	
Data Types	VR1X_1:C.Open_Load_Diagnostics1.1	0		Decimal	BOOL	
Ser-Defined	-VR1X_1:C.Open_Load_Diagnostics1.2	0		Decimal	BOOL	
Add-On-Defined	VR1X_1:C.Open_Load_Diagnostics1.3	0		Decimal	BOOL	
Dredefined	-VR1X_1:C.Open_Load_Diagnostics1.4	0		Decimal	BOOL	
Module-Defined	VR1X_1:C.Open_Load_Diagnostics1.5	0		Decimal	BOOL	
Trends	VR1X_1:C.Open_Load_Diagnostics1.6	0		Decimal	BOOL	
	VR1X_1:C.Open_Load_Diagnostics1.7	0		Decimal	BOOL	
i 🖅 🖅 1756 Backplane, 1756-A7	- VH1X_1:C.Upen_Load_Diagnostics2	2#0000_0000		Binary	SINT	
	VR1X_1:C.Open_Load_Diagnostics2.0	0		Decimal	BOOL	
🖃 🗍 [1] 1756-ENBT/A ENBT	VR1X_1:C.Open_Load_Diagnostics2.1	0		Decimal	BOOL	
Ethernet	VR1X_1:C.Open_Load_Diagnostics2.2	0		Decimal	BOOL	
1756-ENBT/A ENBT	VR1X_1:C.Open_Load_Diagnostics2.3	0		Decimal	BOOL	
Ethernet Valve Island VR series VR1X_1	VR1X_1:C.Upen_Load_Diagnostics2.4	0		Decimal	BUUL	
	VR1X_1:C.Open_Load_Diagnostics2.5	0		Decimal	BOOL	
	VR1X_1:C.Upen_Load_Diagnostics2.6	0		Decimal	BUUL	
	VR1X_1:U.Upen_Load_Diagnostics2.7	0		Decimal	BUUL	
	VH1X_1:C.Upen_Load_Diagnostics3	2#0000_0000		Binary	SINT	
	VR1X_1:U.Upen_Load_Diagnostics3.0	0		Decimal	BOOL	
	VRIX_1:C.Upen_Load_Diagnostics3.1	0		Decimal	BOOL	
	VR1X_1:U.Upen_Load_Diagnostics3.2	0		Decimal	BUUL	
	VRIX_1:C.Open_Load_Diagnostics3.3	0		Decimal	BOOL	
	VR1X_1:U.Upen_Load_Diagnostics3.4	0		Decimal	BUUL	
	VRIX_I:U.Upen_Load_Diagnostics3.5	0		Decimal	BUUL	
	VRIX_1:C.Open_Load_Diagnostics3.6	0		Decimal	BOOL	
	White Inc. Open_coad_biagnostics3.7	0		Decimal	CINT	
	E VP1X_1:C.Fail_Safe_State1	20000_0000		Binary	CINT	
	E. VP1V 1:0 Enil Safe Shate2	2#0000_0000		Dindly	CINIT	
	E WHALLOUR ME Sale States	2#0000_0000		Diridly	0C49-Ethornett/	
	VP1VnectionExulted	()	{}	Decimal	POOL	
		0	r	Decimal	CINITIAN	
		{}	{}	Peciliidi		
	Monitor Tags / Edit Tags /				•	

Enter a tag value





- Value and solenoid number mapping relation is shown in table below.
- The bit that is set to "1" means enable open load diagnostics function of that solenoid.
- The bit that is set to "0" means disable open load diagnostics function of that solenoid.
- Solenoid number and output point mapping relation is shown in Chapter 5.

Open Load Diagnostics 1 Byte											
Solenoid	Sol.08	Sol.07	Sol.06	Sol.05	Sol.04	Sol.03	Sol.02	Sol.01			
Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0			
Value	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1			

Open Load Diagnostics 2 Byte											
Solenoid	Sol.16	Sol.15	Sol.14	Sol.13	Sol.12	Sol.11	Sol.10	Sol.09			
Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0			
Value	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1			

Open Load Diagnostics 3 Byte											
Solenoid	Sol.24	Sol.23	Sol.22	Sol.21	Sol.20	Sol.19	Sol.18	Sol.17			
Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0			
Value	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1			





6.5.3 Fail Safe State Setting

It is possible to define the behaviour of the outputs in case of broken EtherNet/IP communication or PLC stopped.

- Click "Control Tags". (Tag 1)
- Select "Monitor Tag". (Tag 2)
- Expand the "VR1X_1:C" (VR1X_1 is the name of module; it would change if another name used for the module). (Tag 3)
- Set "0" or "1" for each solenoid to define the behaviour of the outputs in case of broken EtherNet/IP communication or PLC stopped. The default value for each solenoid is "0", it means no output of that solenoid in case of broken EtherNet/IP communication or PLC stopped as default. (Tag 4)







- Value and solenoid number mapping relation is shown in table below.
- The bit that is set to "1" means last valid value of that solenoid is retained in case of broken EtherNet/IP communication or PLC stopped.
- The bit that is set to "0" means no output of that solenoid in case of broken EtherNet/IP communication or PLC stopped.
- Solenoid number and output point mapping relation is shown in Chapter 5.

Fail Safe State 1 Byte											
Solenoid	Sol.08	Sol.07	Sol.06	Sol.05	Sol.04	Sol.03	Sol.02	Sol.01			
Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0			
Value	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1			

Fail Safe State 2 Byte								
Solenoid	Sol.16	Sol.15	Sol.14	Sol.13	Sol.12	Sol.11	Sol.10	Sol.09
Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Value	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1

Fail Safe State 3 Byte								
Solenoid	Sol.24	Sol.23	Sol.22	Sol.21	Sol.20	Sol.19	Sol.18	Sol.17
Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Value	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1





6.5.4 Voltage and Short Circuit Diagnostics

VR10 / VR15 valve manifold supports voltage diagnostics for both electronic power and valve power and short circuit diagnostics for each solenoid. These two diagnostic functions cannot be disabled.

- In case of over / under voltage the related LEDs on the valve manifold change color from green to red.
- In case of short circuit MS LED on the valve manifold change from green to red flashing.





6.6 CYCLE COUNTING DATA ACQUISITION

In EDS file, cycle counting data is defined as "Assembly Object Instance: 101d, Class: 0x04". VR10 / VR15 valve manifold supports cycle counting for each solenoid.

- Cycle counting data can be obtained by ladder Element "MSG".
- The following steps give brief instruction of using "MSG" to get data from VR10/VR15.
- In the message configuration of "MSG". (Tag 1)
- Select Service Type "Get Attribute Single". (Tag 2-3)



Message Configuration - READ_C							
Configuratio	n Communication Tag						
Message	Type: CIP Generic	•					
Service Type: Service Code: Instance:	Custom Accept/Connection Apply Athobues Audit Value Get Changes To Detect Get Changes To Detect Set Controller Log Add Entry Controller Log Automatic Write Set Controller Log Automatic Write Set Controller Log Config Execution Set Controller Log Config Execution Set	2 ce Element Jostice Length Destination Element: New Tag					
Enable Error Coo Error Path:	Controller Log Write To Media Custom DeleteSocket Device Reset Device WH0 Get Attribute Single OpenConnection	Done Done Length: 0					
Error Text:	Parameter Read Parameter Write PLS Axis Configuration PLS Input Registration PLS Offsets	Cancel Apply Help					

- Set "Class" Value to 4. (Tag 4)
- Set "Instance" Value to 101. (Tag 5)
- Set "Attribute" Value to 3. (Tag 6)
- Click "Destination Element". Select variable which Data Type is "DINT [24]" and created for storing counter, then double click it. (Tag 7-8)

Message Configuration - READ_C Configuration* Communication Tag Message Type: CIP Generic	•	2	3	
Service Get Attribute Single Type: Service e (Hex) Class: 4 (Hex) Code: 101 Attribute 3 (Hex) 5 6	Source Element: Source Length: Destination Element:	0 ⊕ (Bytes) Cycle_Counting ↓ YEnter Mane Filter Name 1 + Cycle_Counting 1 + Cycle_Counting 1 # Cycle_Counting	Show: All Tags	cription
C Enable Enable Wating Start Error Code: Extended Error Code: Error Path: Error Text: OK	O Done Do			E
	Cancel	Controller Program		-





- Select "Communication" Tab. (Tag 9)
- Click "Browse" button. (Tag 10)

 Select the valve manifold module and click OK. (Tag 11-12)



Message Conf	figuration - READ_C	4
Configurati	Message Path Browser	1
Pa	Path: VR1X_1	
O Broa	VB1X_1	
Commu	⊡	
© CIP	□	
CIP		
Sou	1756-ENBT/A ENBT	
Cor	Ethernet Valve Island VR series VR1X_1	
Enable	12	
C Error Co		
Error Path: Error Text:	OK Cancel Help	
List fund.		1
	UK Cancel Apply Help	IJ





- Add an "Examine On" element connect to "MSG" element. (Tag 13)
- Download the program to PLC and set PLC to Run Mode, then every time getting a rising edge of the "Examine On" element, counter number data can be got by MSG element. (Tag 14)

		_ 8 ×
	ine No Forces Who Active Select Recent Path Go Online Upload	
Read Read <th< td=""><td>Program Mode Bun Mode Iest Mode Lock Controller Clear Faults Gg To Faults</td><td>MSC Message Control READ_C (ER)</td></th<>	Program Mode Bun Mode Iest Mode Lock Controller Clear Faults Gg To Faults	MSC Message Control READ_C (ER)





6.7 CYCLE COUNTER RESETTING

In EDS file, cycle counter resetting data is defined as "Assembly Object Instance: 102d, Class: 0x04".

VR10 / VR15 valve manifold supports counter reset for each solenoid.

- Cycle counter data can be reset by ladder Element "MSG".
- The following steps give brief instruction of using "MSG" to reset cycle counter data of VR10/VR15.
- In the message configuration of "MSG". (Tag 1)

 Select Service Type "Set Attribute Single". (Tag 2-3)





- Set "Class" Value 4. (Tag 4)
- Set "Instance" Value 102. (Tag 5)
- Set "Attribute" Value 3. (Tag 6)
- Click "Source Element". Select variable which Data Type is "DINT [3]" and created for counter reset, then double click it. (Tag 7-8)

Message	Type: CIP Gene	ric		•					
Service Type:	Set Attribute Single	-	Source Elemen	nt	Сог	nter_Reset 🗸	7		
.,,,		4	Source Length	τ	Υ.	Enter Name Filter	 Show: All Tags 		
Service Code:	10 (Hex) Class:	4 (Hex)	Destination			Name	== Data Type	Description	-
Instance:	102 Attribut	e: 3 (Hex)	Element:		1	+ Counter_Reset	SINT[3]	8	
					1	+ Cycle_Counting	DINT[24]	•	_
	5	6			Ē	Read Nam	ne: Counter_Reset		
					ň	+- READ_C Data	Type: SINT[3]		
					ň	+ Reset_C Desc	ription:		
					ň	+-VR1X_1:C	_0649:Ethern		
) Enable	O Enable Waiting	O Start	O Done	Dor	đ	+-VR1X_1:I	_0649:Ethern		
					Ĩ	+-VR1X_1:0	_0649:Ethern		
) Error Cor	ie: Extend	led Error Code:							





•

Counter_Reset

Tag...

🚖 (Bytes)

3

9

Done Length: 0

Timed Out 🗧

Source Element:

Source Length:

Destination

Element:

O Done

(Hex)

(Hex)

X

 Set "Source Length" Value 3. (Tag 9)

- Select "Communication" Tab. (Tag 10)
- Click "Browse" button. (Tag 11)

Select the valve manifold module

and click OK. (Tag 12-13)

Error Path: Error Text: OK Cancel Apply Help × Message Configurati set_C 10 ation Tag Configuration* Com Browse 11 Path: Broadcast: ÷ Communication Method 'A' Destination Link: 0 CIP
 DH+ Channel: CIP With Source ID Destination Node: Source Link: 0 0 🔶 (Octal) Connected 🗸 Cache Connections 🗧 🗧 Large Connection ○ Enable ○ Enable Waiting ○ Start O Done Done Length: 0 O Error Code: Extended Error Code: 🔲 Timed Out 🗲 Error Path: Error Text: OK Cancel Apply Help 23 Message Configuration - Reset_C Configurati Message Path Browser 33 ۲ Path: VB1X_1 VB1X_1 Bro Comr CI S 🗄 🚠 Ethernet 1756-ENBT/A ENBT Co 12 O Enable 13 O Error Co Error Path: ΟK Cancel Help Error Text ОК Cancel Apply Help

Construction & Design is subject to change (A1743-OPM-EP / Rev.1)



Message Configuration - Reset_C

Message Type:

Service 10 Code:

Instance: 102

O Error Code:

Configuration* Communication Tag

Service Set Attribute Single

CIP Generic

(Hex) Class: 4

O Enable O Enable Waiting O Start

Attribute: 3

Extended Error Code



 Expand variable created for counter reset, whether clear & reset cycle counting value for the solenoid or not can be decided by corresponding bit is "1" or "0". All bits were set to "0" as default. (Tag 14-15)







- Value and solenoid number mapping relation is shown in table below.
- The bit that is set to "1" means to clear & reset cycle counting value of that solenoid.
- The bit that is set to "0" means no action of clear & reset.

Counter reset [0] Byte								
Solenoid	Sol.08	Sol.07	Sol.06	Sol.05	Sol.04	Sol.03	Sol.02	Sol.01
Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Value	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1

Counter reset [1] Byte								
Solenoid	Sol.16	Sol.15	Sol.14	Sol.13	Sol.12	Sol.11	Sol.10	Sol.09
Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Value	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1

Counter reset [2] Byte								
Solenoid	Sol.24	Sol.23	Sol.22	Sol.21	Sol.20	Sol.19	Sol.18	Sol.17
Bit	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Value	0 / 1	0 / 1	0 / 1	0/1	0 / 1	0 / 1	0 / 1	0/1

- Add an "Examine On" element connect to "MSG" element. (Tag 16)
- Download the program to PLC and set PLC to Run Mode, then every time getting a rising edge of the "Examine On" element, clear & reset action will be executed by MSG element "Reset_C". (Tag 17)

 ▼ → → → + +	Offine No Force Who Active Select Recent Path Go Online Upload Download	rces 🔽 💽 👘 🖉 👔 🦓 🖓 <table-cell> 🖓 <table-cell></table-cell></table-cell>
Read Reset 1 1 1 1 1 1 1 1 1 1 1 1 1	Program Mode Run Mode Lust Mode Lock Controller Clear Faults Go To Faults	MSG Message Control READ_C (CN)- (ER)-(ER)-(ER)-(ER)-(ER)-(ER)-(ER)-(ER)-
(End)		





7 LED STATUS DESCRIPTION



Symbol	LED Status	Description		
	Off	No IP address or no power		
NG	Green on	Connected		
NO	Flashing green	Not Connected		
	Flashing red	Connection Timeout		
	Off	No power		
MS	Green on	Device Operational		
MO	Flashing red	Recoverable fault		
	Red on	Non-recoverable fault		
	Off	Link Connection Not Established		
P1	Flashing yellow / green	Link Communication Active		
	Yellow on	Link Connection Established		
	Off	Link Connection Not Established		
P2	Flashing yellow / green	Link Communication Active		
	Yellow on	Link Connection Established		
VA	Green on	Voltage OK		
	Flashing red	Undervoltage		
(Valve Power Supply)	Red	Overvoltage		
VB	Green on	Voltage OK		
	Flashing red	Undervoltage		
(Electronics Power Supply)	Red	Overvoltage		





8 TECHNICAL DATA EtherNet/IP INTERFACE

Specification		Remark
Number of ports	2	
Link Speed	100Mbit/s	
Duplex Mode	Full Duplex	
DLR Mode	Supported	Device Level Ring
EtherNet/IP (ODVA Certification)	Compliant to IEC61158	
IP Address modes	Static, DHCP	
EDS languages	EN	

Note:

EtherNet/IP version:

Volume 1 (Edition 3.24) and Volume 2 (Edition 1.23).



9 CUSTOMER SUPPORT

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