



# **TRANSNET PIPELINES JAMESON PARK TERMINAL**

## **DATASHEETS FOR Medium Voltage VSD's for Mainline Pump Motors**

**=59VSD09; =59VSD10**

NMPP Document No. : 60641452-A-JMP-EL-DS-001  
NMPP Old Document No. : 2684358-P-TM2-EL-DS-016

Date : 10 Jun 2022  
Rev. : 01



Special Instructions		NMPP Doc. No.		60641452-A-JMP-EL-DS-001	
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		Page No.	3	Revision	01
<p align="center"><b>Tag: 59VSD09; 59VSD10</b></p> <p align="center"><b>Description : MV Variable Speed Drives</b></p>					
1					
2	This Datasheet defines the minimum requirements for free standing, front entry variable speed drive (VSD) panels.				
3	(See tag list for details).				
4					
5	SCOPE OF WORK:				
6	Design, supply, manufacture, routine testing, factory acceptance testing, preparation for shipment, transport to site, supervision of				
7	off-loading and installation by others, commissioning and documentation for free-standing front entry VSD panels.				
8					
9	Development of all logics for and programming of all control and protection devices including supply of all required				
10	software, hardware and Control will be via Profibus DP network.				
11	Remote engineering and monitoring shall be by a separate IEC 61850 compliant network link.				
12					
13					
14	COMPLIANCE:				
15	The Variable Speed Drives shall comply with NMPP Specification 4684358-U-A00_EL-SP-004				
16	All wiring, panel manufacture, etc must comply with the Client specifications referenced in PL727.				
17	Total Harmonic generation shall comply with IEEE 519, as well as NRS048.				
18	Radio Frequency Interference shall comply with IEC 61000.				
19					
20	CONTROL PHILOSOPHY:				
21	Control to the PLC shall be via Profibus DP				
22	The VSD shall receive Speed control setpoint Input from PLC and the feedback signal to PLC shall be Profibus.				
23	The VSD shall have a seaprate Ethernet port for connection to a IEC 61850 compliant network for remote access.				
24					
25	CABLE ENTRY:				
26	Cable entry into the VSD will be from bottom.				
27	Provision must be made for incoming power terminals at the bottom				
28					
29	CONTROL VOLTAGE				
30	230Vac single phase control power from UPS shall be provided by others.				
31	3 ph, 400V UPS auxilliary power shall be provided by others				
32					
33	COLOUR CODING OF ELECTRICAL EQUIPMENT :				
34	Painting to be in accordance with Manufacturer Specification				
35					
36					
37	ADDITIONAL:				
38	Vendor shall furnish a priced list of recommended spares for two years operation.				
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40	Hazardous area shall be safe.				
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		<b>Inspection Data Sheet</b>		NMPP Doc. No. <b>60641452-A-JMP-EL-DS-001</b>	
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<p align="center"><b>Tag: 59VSD09; 59VSD10</b></p> <p align="center"><b>Description : MV Variable Speed Drives</b></p>					
1	<b>Codes/Standards :-</b>	Inspection			
2	IEC	By			Date
3		Manu- facturer			
4			Insp	Elect	Client
5					
6	Compliance with technical specification	X	X	X	x
7	Compliance with drawings	X	X	X	x
8	Compliance with codes/standards	X	X	X	x
9					
10					
11					
12	Satisfactory workmanship	X	X		x
13	Surface defects	X	X		x
14	Correct dimensions	X	X		
15	Painting	X	X		
16	Marking/nameplate	X	X		x
17					
18					
19					
20					
21					
22					
23	Functional test (mechanical & electrical operations, interlockings)	X		X	x
24	Complete with motor handstation and 4-20mA source				
25					
26					
27	Test for creepage paths and flashover distances in air	X			
28	Test for mechanical operation	X			
29	Test for type of protection	X	X	X	X
30	Test for protective measures against accidental contact	X	X	X	X
31	Test certificate	X	X	X	
32	Communication between PLC and VSD	X		X	X
33					
34	Measuring of Filter influences	X	X	X	X
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50	Note : The Supplier shall follow the requirements for FAT & SAT and understand roles & responsibilities of the various agencies involved as described in the specifications.				
51					
52	<b>Documents required for inspection :-</b>	<b>Remarks :</b>			
53	NMPP Technical specification	1) May be shown by type test			
54	Type test certificates & reports				
55	VSD Parameter Set up Lists				
56	Schematic diagrams				
57	General Arrangement & Layout Drawings				
58					
59					
60					
61					
62					

		<b>Documentation Requirements</b>		NMPP Doc. No.		60641452-A-JMP-EL-DS-001		
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<p align="center"><b>Tag: 59VSD09; 59VSD10</b></p> <p align="center"><b>Description : MV Variable Speed Drives</b></p>								
<b>Documents to be furnished by the Manufacturer</b>		<b>E1</b>	<b>E2</b>	<b>E3</b>	<b>E4</b>	<b>E5</b>	<b>E6</b>	<b>E7 Package</b>
		Package Date	Package Date	Package Date	Package Date	Package Date	Package Date	Date
		Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity
1	Completed NMPP Technical Specification (Data Sheet Package)	3	3			Final Documentation. (See final documentation index) Three hard copies and three electronic copies in CD are to be submitted.		
2	Time Schedule (See note 3)	3	3					
3	QC Plan (See note 3)	3	3					
4	Catalogue Information	3	3					
5	Technical Specification & Operators Manual		3					
6	Drawings - Schematics & General Assembly Diagram		3	3				
7	List of Tools/Instruments for Testing		N/A					
8	Completed SPIR Form			3				
9	Hazardous Area Certification				N/A			
10	Test Certificates				3			
11	CD of Documentation		1	1	1			
12	VSD Parameter Set up List			3				
13	Harmonics Generation Document			3				
14	Filter Sizing Calculation (Input/Output)		N/A					
15	Full details of Test Procedures (as per Project Specifications)			3				
16	FAT package files (as per Proj Spec)			3				
17	VSD/Motor combination testing for Zone 1 certification				3			
18								
19								
20								
<b>Legend :-</b>		E4 Package - +- 2 weeks after inspection E5 Package - +- 2 weeks after delivery E6 Package - E7 Package -						
E1 Package - With tender E2 Package - +- 2 weeks after order E3 Package - +- 1 week prior to inspection								
<b>Notes :-</b> 1. A package may only be submitted when the previously submitted package is 'A' approved. No approval will be done for the E1 package. 2. One set of quantities as specified above for the operating and maintenance manuals may be submitted for all motors covered by one manual. 3. Documents marked with 'note 3' may be omitted if not needed by Purchaser QA/QC department. 5. Original Hazardous Classification Certificates to be handed over at factory release. 5. Documentation which are to be provided as shipping documents are not included in this form. 6. Any package submitted which is lacking in content and/or quality, such that a detailed review cannot be carried out, will immediately be returned to the manufacturer and the submission shall be deemed not to have been carried out. 7. "As-built" copies of all drawings and data sheets shall be supplied with the E5 package.								

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<p style="text-align: center;"><b>Tag: 59VSD09; 59VSD10</b></p> <p style="text-align: center;"><b>Description : MV Variable Speed Drives</b></p>					
No.	Documents	Documentation Required			
1	Completed NMPP Technical Specification (Data Sheet Package)	Yes			
2	Bill of Materials	Yes			
3	Quality Control Plan	Yes			
4	Technical Specification	Yes			
5	Operators Manual	Yes			
6	Drawings	Yes			
7	Completed SPIR Form	Yes			
8	Hazardous Area Certification	No			
9	Test Certificates	Yes			
10	VSD Parameter Set Up List	Yes			
11	Harmonics Generation Document	Yes			
12	Filter Sizing Calculation	N/A			
13	Test Procedures	Yes			
14	FAT Package Files	Yes			
15	Maintenance Manuals	Yes			
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### Tag List

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Tag: 59VSD09; 59VSD10

Description : MV Variable Speed Drives

No.	VSD Tag No.	Service	Cubicle No.	Comment
1	=59VSD09	59-P09		for Mainline Pump 59P09
2	=59VSD10	59-P10		for Mainline Pump 59P10
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**TERMINAL 2****Technical Data Sheet 1**

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**Item No. : 59VSD09; 59VSD10****Description : Variable Speed Drives**

1	Equipment Tag No.	
2	Variable Speed Drive for Mainline Pump P09	VSD09
3	Variable Speed Drive for Mainline Pump P10	VSD10
8	Equipment Service	Variable Speed Drive for Squirrel Cage Induction Motor
9	Site Conditions	
10	Ambient Temperature	1°C to 40°C
11	Altitude	1800 masl
12	Power Supply Details	
13	Supply Voltage	2 x 1903 V, 3-phase $\pm 7.5\%$ (via 11kV/2x 1903V Converter Transformer)
14	Supply Frequency	50 Hz $\pm 2\%$
15	System Fault level	25 kA
16	Upstream Circuit Breaker	Vacuum Circuit Breaker
17	Power Factor at full load	0.95
18	Total Harmonic Distortion	< 3%
19	Input Choke Required for Harmonics	No
20	Internal Control Supply	Supplied from UPS
21	Supply Cable Size	4 x 95mm <sup>2</sup> , 3-core XLPE
22	Load Characteristics	
23	Motor Rated Power	1300 kW
24	Motor Type	Squirrel Cage Induction Motor
25	Rated Voltage	3300 V
26	Rated Speed of Motor	3150 rpm
27	Rated Full load Current of Motor	280 A
28	Application	Centrifugal Pump
29	External Braking Resistor	No
30	Motor Ex Protection	Ex de IIB T4 (IEC 60079-1)
31	Motor Cable Size	2x 120mm <sup>2</sup> , 3-core XLPE
32	Motor Cable Length	140 metres (max)
33	VSD Manufacturer	ABB
34	Type of VSD	ACS1000
35	VSD Model	ACS1000-033-W01A-E2-010
36	VSD Rating (input)	2685 kVA
37	VSD Rating (output)	2572 kVA
38	Efficiency	0.98
39	Power dissipation	36,7 kW
40	Module Cooling	Liquid-cooled
41	Nr Converter Pulses	12-pulse
42	Total Harmonic Distortion	
43	Voltage	0.28%
44	Current	6.42%
45	Location	Indoors
46	Type of Rectifier	Diode
47	Type of Inverter	Voltage Source
48	Power Switching Technology	IGCT
49	Power Switching Control Method	Direct Torque Control
50	Switching Frequency	8 kHz max
51	Overload Capacity	110% - 60 sec in 600sec
52	Function Required/Provided	
53	DC Injection Braking	Yes
54	Acceleration/Deceleration Time Selection	Yes
55	Auto Tuning	No
56	Slip Compensation	Yes
57	Momentary Supply Loss Ride-through	Yes
58	Speed Search	Yes
59	Multi-Speed Operation	Yes
60	Frequency Accuracy	10% of motor slip
61	Starting Torque	2 x Nomimal
62	Torque Boost	0-250%
63	Jump Frequency	Yes
64	Thermal Overload	Yes

Notes:-

1. All items marked " \* " are furnished by vendor. Vendor adds any and all remarks in columns provided.
2. All SANS, IEC and other International Standards referred in listed Transnet Specifications are applicable.





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**Item No. : 59VSD09; 59VSD10**

**Description : Variable Speed Drives**

1	Function Required/Provided (cont.)	
2	Definite Time Overload	Yes
3	Instantaneous Overcurrent	Yes
4	Short-circuit protection for load	Yes
5	Overvoltage Protection	Yes
6	Undervoltage Protection	Yes
7	Motor Temperature Monitoring	Yes
8	Single Phasing/Unbalance	Yes
9	Earth Fault	Yes
10	Stall Protection	Yes
11	HeatSink Overheating	Yes
12	Fault Retry Operation	Yes
13	Display	
14	Supply Voltage	Yes
15	Input Current	Yes
16	Power Factor	No
17	Output Voltage	Yes
18	Output Current	Yes
19	Output Frequency	Yes
20	Output Speed	Yes
21	Output Power	Yes
22	kWh	Yes
23	Type of Display for alarms	LCD with backlight
24	Type of Display for indication	LCD with backlight
25		(note: VSD display, alarm, HDMI panel to be mounted such to be visible and
26		accessible from front panel)
27	Remote Indications	
28	Frequency/Speed	4-20 mA
29	Voltage Signal	See Special Instructions sheet
30	System Healthy	Potential free contact
31	Load Current	4-20 mA
32	Bypass Mode	N/A
33	Ready to Start	Potential free contact
34	Running	Potential free contact
35	Failure	Potential free contact
36	Communication Protocol	Profibus DP
37	Control Inputs/Outputs	
38	Start	Yes
39	Stop	Yes
40	Speed Control Setting	4-20 mA & Profibus DP
41	Frequency/Speed Feedback	4-20 mA & Profibus DP
42	Cabinet Details	
43	Manufacturer	ABB
44	Cabinet Type	Single Front Entry
45	Cabinet Mounting	Floor
46	Compartmentalised	No
47	Ingress Protection	IP42
48	Explosion Protection	N/A
49	Access	Front Only
50	Cable Wireway	Separate
51	Busbar Reserve	Internal, Cabling within Drive
52	Sheet Material Thickness	Mild steel, 1,5mm
53	Glandplate Material Thickness	Mild steel, 2 mm
54	Material of external bolts and metal parts	Mild steel passivated
55	Overall Dimensions	4200mm W x 902mm D x 2002mm H
56	Overall Weight	3300 kg
57	Louvre Cover Wire Mesh Material	Metal
58	Gasket Material	Neoprene
59	NamePlate Material	Traffolite
60	Type	Black letters on white background
61	Thickness	3 mm
62	Letter Size	45 mm
63	Inscription	VSD Tag No (see taglist)
64	Motor Space Heater Control	Yes

Notes:-

1. All items marked " \* " are furnished by vendor. Vendor adds any and all remarks in columns provided.
2. All SANS, IEC and other International Standards referred in listed Transnet Specifications are applicable.



TERMINAL 2

Technical Data Sheet 3

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Item No. : 59VSD09; 59VSD10

Description : Variable Speed Drives

1	Cabinet Details (cont.)		
2	Earth bus		
3	Material	Copper	
4	Busbar Size	20 x 5 mm	
5	Painting		
6	Surface treatment	Chemical Clean	
7	Primer	Passivated	
8	Final Paint	Powder Coated	
9	Paint Thickness	50 micron	
10	Final Paint Colour	Light Grey - RAL 7035	
11	VSD Cooling Arrangement	External Chillers (water-cooled)	
12	VSD Cooling Water Pumps Manufacturer	TBC	
13	No. of VSD Cooling Water Pumps	2	
14	VSD Cooling Water Pumps Rating	2,3 kW, 400V 3-phase, 4,1 A	
15	VSD Heat Exchanger Details		
16	Manufacturer	TBC	
17	Capacity	45 kW	
18	External Chiller Details		
19	Manufacturer	TBC	To be confirmed
20	Rated Power	24 kW	To be confirmed
21	Nominal Power Supply Details	400 V, 3-phase 50 Hz $\pm 10\%$	To be confirmed
22	Nominal Current	46 A	To be confirmed
23	Nominal Cooling Capacity	62 kW	To be confirmed
24	Refrigerant	R410A	To be confirmed
25	Refrigerant Quantity	8,75 kg + 8,75 kg	To be confirmed
26	Maximum Operating Pressure	35 bar	To be confirmed
27	Noise Level	48 dB	To be confirmed
28	Chiller Dimensions	2450 mm L x 1606mm H x 1100mm D	To be confirmed
29	Weight	1120 kg	To be confirmed
30	No. of Cooling Circuits	2	To be confirmed
31	No. of Compressors	2	To be confirmed
32	Compressor Rating	11.9 kW, 400V, 3-phase 50 Hz, 20.1 A	To be confirmed
33	No. of Cooling Axial Fans	6	To be confirmed
34	Cooling Axial Fans Rating	0,42 kW, 400V, 3-phase 50 Hz, 0,76 A	To be confirmed
35	No. of Cooling Pumps	2	To be confirmed
36	Cooling Pumps Rating	4 kW, 400V, 3-phase 50 Hz, 8.14 A	To be confirmed
37	No. of Crankcase Heaters	2	To be confirmed
38	Crankcase Heater Rating	65W, 230V	To be confirmed
39	Evaporator Heater Rating	150W, 230V	To be confirmed
40	Auxilliary Control Voltage	24 Vac	To be confirmed
41	Colour Code	RAL 9002 (powder coated)	
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