Base Load Power Hub (BLPH)

NITROGEN GENERATION PACKAGE A-64000
INSTRUMENT DATA SHEETS

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1 INTRODUCTION

1.1 PROJECT OVERVIEW

Crosswind, a Shell and Eneco joint venture, was awarded the tender to develop the offshore Hollandse Kust Noord (HKN) wind farm, located 18.5km off the coast of Netherlands near the town of Egmond aan Zee. The consortium plans to have HKN operational in 2023 with an installed capacity of 759MW generating at least 3.3TWh per year. This is sufficient renewable power to supply more than 1 million Dutch households with green electricity.

Offshore wind farms produce intermittent electricity and balancing these dips and peaks and integrating this electricity into the national energy system requires new technologies. For this reason, the offshore wind farm will include several new technologies that could be implemented at full-scale in the future. The new technologies being explored include a floating solar park, a short-duration battery storage as well as long-term storage via green hydrogen produced by water electrolysis and subsequently consumed in a fuel cell. The combination of these individual measures, herein referred to as the Base Load Power Hub (BLPH) will ensure a continuous power supply regardless of the wind situation.

1.1.1 Project Location

The Hollandse Kust Noord (HKN) wind farm is located 18.5km off the coast of the Netherlands near the town of Egmond aan Zee.

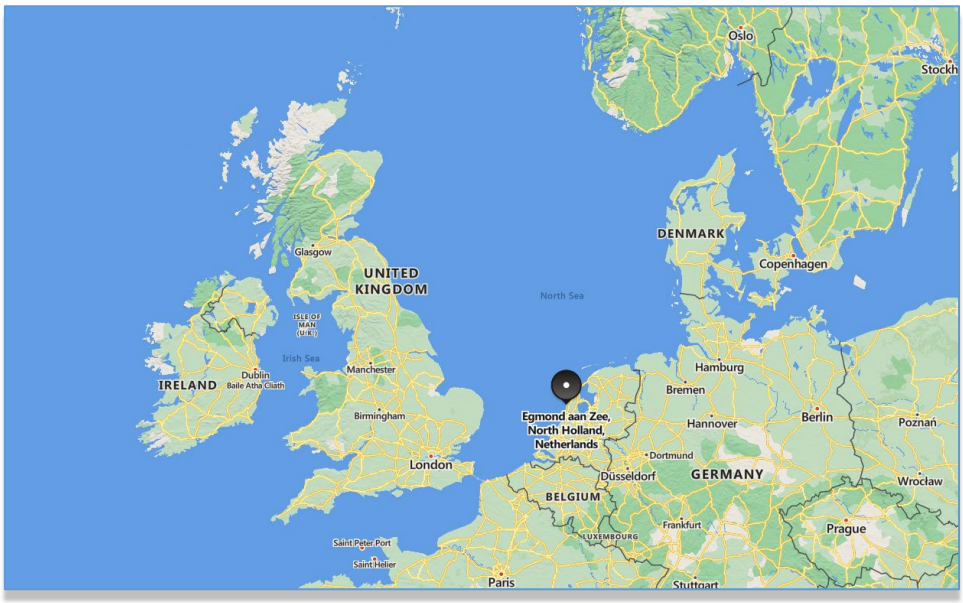


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map

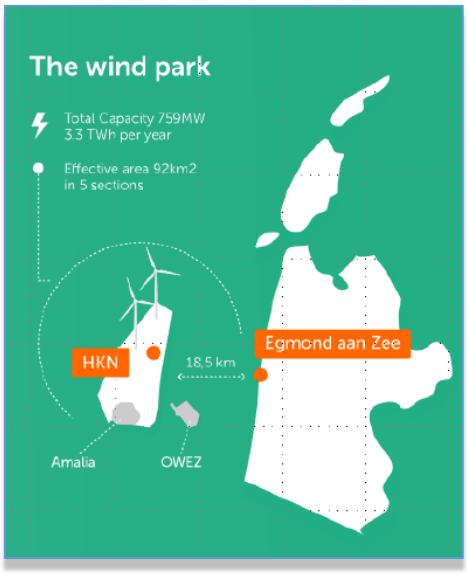


Figure 2 - Wind Park Details

The wind farm will consist of No. 69 x 11.5MW wind turbine generators each to be installed on a dedicated monopile structure. A 70th monopile located on coordinates E 590719.1, N 5841602.3 is reserved for installing the platform accommodating the BLPH. The monopile structure was designed and installed by Van Oord Offshore Wind (VooW) and therefore not part of the BLPH scope.

1.1.2 Project Concept

All components included in the BLPH will be integrated onshore on a topsides and installed in an offshore location within the boundaries of the HKN wind farm. At its simplest, the BLPH will store energy during periods of high electricity generation from renewable sources (a wind turbine generator and the floating solar PV farm) and release it during periods of low generation. In practice. It is expected that the energy stored will supplement generation from renewable sources to ensure that at least 1.0MW of power is exported to the electrical grid regardless of wind/solar availability.

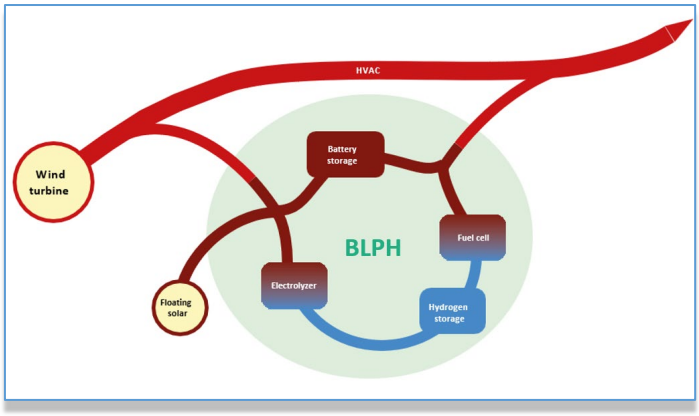


Figure 3 – BLPH Concept

Electricity in the BLPH will be stored in the form of electrons in a battery energy storage system (BESS) as well as converted into green hydrogen via water electrolysis. When the power output from the connecting wind turbine drops to below 1 MWe, the BLPH will return its stored energy to supplement the remaining power output. This will be by discharging the BESS, while stored hydrogen will be converted back into electricity using a fuel cell to extend the discharge duration.

The purpose of the BLPH s to function as a testbed for the integration of energy storage technologies with renewable generation. It is expected that equipment installed on the BLPH will operate as Normally Unmanned Installation for at least two (2) years with no or minimal maintenance and it will have its own independent control room with the ability to communicate with Crosswind's control room.

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2 DOCUMENT SCOPE

This document identifies any electrical equipment to be fed with its main characteristics.

2.1 REFERENCES

Doc. No.	Description
1724000437-PR-PID-00018	PACKAGE P&ID
1724000437-MAC-DS-00011	EQUIPMENT DATA SHEETS INCLUDING PSA, ETC.

Table 1 - Reference Documents

2.2 DEFINITIONS AND ABBREVIATIONS

COMPANY or Client (CPY):	Crosswind
CONTRACTOR (CTR):	ROSETTI MARINO S.p.A.
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project
RF	RAISED FACE

Table 2 - Definitions and Abbreviations

3 INSTRUMENT DATASHEET

PRESSURE TRANSMITTER			
General	1	Tag number	64-PIT-051
	2	Service	Instrument air inlet pressure
	3	Quantity	1
Process	4	Fluid	Air
	5	Operating pressure	9 barg
	6	Operating temperature	40°C
	7	Design pressure	12 barg
	8	Design temperature	80°C
	9	Area classification	Safe
	10	Ambient temperature	-8.4 ÷ 25°C
Transmitter	11	Output	4…20mA HART 7
	12	Available range	-0.98 ÷ 20.7 bar
	13	Calibrated range	0 ÷ 16 barg
	14	Element type	Isolating Diaphragm
	15	Wetted parts material	SS 316L
	16	Element material	SS 316L
	17	Case material	SS 316L
	18	Execution	IP66
	19	Process connections	Female thread 1/2-14 NPT-F
	20	Cable entry	M20x1.5
	21	Digital display	YES - LCD type integrated
	22	Accuracy	Better than 0.25% of adjusted span
	23	Power supply	24 VDC
	24	Certification:	ATEX, II 1/2 G Ex db IIC T6…T4 Ga/Gb
Accessories	25	Manifold Supplier	EMERSON
	26	Manifold type / Model	2-Valves / R305C22B11L4
	27	Manifold mat.l Body / seal	SS316 / PTFE
Purchase	28	Instrument Manufacturer	EMERSON
	29	Model	2051CG4A22A1KS5E8L4M5D4T1Q4Q8HR7
Notes	30		

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PRESSURE TRANSMITTER			
General	1	Tag number	64-PIT-052, 64-PIT-053
	2	Service	PSA tower pressure
	3	Quantity	2
Process	4	Fluid	Air
	5	Operating pressure	9 barg
	6	Operating temperature	40°C
	7	Design pressure	12 barg
	8	Design temperature	80°C
	9	Area classification	Safe
	10	Ambient temperature	-8.4 ÷ 25°C
Transmitter	11	Output	4…20mA HART 7
	12	Available range	-0.98 ÷ 20.7 bar
	13	Calibrated range	0 ÷ 16 barg
	14	Element type	Isolating Diaphragm
	15	Wetted parts material	SS 316L
	16	Element material	SS 316L
	17	Case material	SS 316L
	18	Execution	IP66
	19	Process connections	Female thread 1/2-14 NPT-F
	20	Cable entry	M20x1.5
	21	Digital display	YES - LCD type integrated
	22	Accuracy	Better than 0.25% of adjusted span
	23	Power supply	24 VDC
	24	Certification:	ATEX, II 1/2 G Ex db IIC T6…T4 Ga/Gb
Accessories	25	Manifold Supplier	EMERSON
	26	Manifold type / Model	2-Valves / R305C22B11L4
	27	Manifold mat.l Body / seal	SS316 / PTFE
Purchase	28	Instrument Manufacturer	EMERSON
	29	Model	2051CG4A22A1KS5E8L4M5D4T1Q4Q8HR7
Notes	30		

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PRESSURE TRANSMITTER			
General	1	Tag number	64-PIT-057
	2	Service	Nitrogen outlet pressure
	3	Quantity	1
Process	4	Fluid	Nitrogen
	5	Operating pressure	8 barg
	6	Operating temperature	40°C
	7	Design pressure	12 barg
	8	Design temperature	80°C
	9	Area classification	Safe
	10	Ambient temperature	-8.4 ÷ 25°C
Transmitter	11	Output	4…20mA HART 7
	12	Available range	-0.98 ÷ 20.7 bar
	13	Calibrated range	0 ÷ 16 barg
	14	Element type	Isolating Diaphragm
	15	Wetted parts material	SS 316L
	16	Element material	SS 316L
	17	Case material	SS 316L
	18	Execution	IP66
	19	Process connections	Female thread 1/2-14 NPT-F
	20	Cable entry	M20x1.5
	21	Digital display	YES - LCD type integrated
	22	Accuracy	Better than 0.25% of adjusted span
	23	Power supply	24 VDC
	24	Certification:	ATEX, II 1/2 G Ex db IIC T6…T4 Ga/Gb
Accessories	25	Manifold Supplier	EMERSON
	26	Manifold type / Model	2-Valves / R305C22B11L4
	27	Manifold mat.l Body / seal	SS316 / PTFE
Purchase	28	Instrument Manufacturer	EMERSON
	29	Model	2051CG4A22A1KS5E8L4M5D4T1Q4Q8HR7
Notes	30		

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PRESSURE TRANSMITTER			
General	1	Tag number	64-PIT-059
	2	Service	Nitrogen receiver pressure
	3	Quantity	1
Process	4	Fluid	Nitrogen
	5	Operating pressure	8 barg
	6	Operating temperature	40°C
	7	Design pressure	12 barg
	8	Design temperature	80°C
	9	Area classification	Safe
	10	Ambient temperature	-8.4 ÷ 25°C
Transmitter	11	Output	4…20mA HART 7
	12	Available range	-0.98 ÷ 20.7 bar
	13	Calibrated range	0 ÷ 16 barg
	14	Element type	Isolating Diaphragm
	15	Wetted parts material	SS 316L
	16	Element material	SS 316L
	17	Case material	SS 316L
	18	Execution	IP66
	19	Process connections	Female thread 1/2-14 NPT-F
	20	Cable entry	M20x1.5
	21	Digital display	YES - LCD type integrated
	22	Accuracy	Better than 0.25% of adjusted span
	23	Power supply	24 VDC
	24	Certification:	ATEX, II 1/2 G Ex db IIC T6…T4 Ga/Gb
Accessories	25	Manifold Supplier	EMERSON
	26	Manifold type / Model	2-Valves / R305C22B11L4
	27	Manifold mat.l Body / seal	SS316 / PTFE
Purchase	28	Instrument Manufacturer	EMERSON
	29	Model	2051CG4A22A1KS5E8L4M5D4T1Q4Q8HR7
Notes	30		

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DIFFERENTIAL PRESSURE TRANSMITTER			
General	1	Tag number	64-PDIT-056
	2	Service	After-filters pressure drop
	3	Quantity	1
Process	4	Fluid	Nitrogen
	5	Operating pressure	8 barg
	6	Operating temperature	40°C
	7	Design pressure	12 barg
	8	Design temperature	80°C
	9	Area classification	Safe
	10	Ambient temperature	-8.4 ÷ 25°C
Transmitter	11	Output	4…20mA HART 7
	12	Available range	-2.5 ÷ 2.5 bar
	13	Calibrated range	0 ÷ 1 bar
	14	Element type	Isolating Diaphragm
	15	Wetted parts material	SS 316L
	16	Element material	SS 316L
	17	Case material	SS 316L
	18	Execution	IP66
	19	Process connections	Female thread 1/2-14 NPT-F
	20	Cable entry	M20x1.5
	21	Digital display	YES - LCD type integrated
	22	Accuracy	Better than 0.25% of adjusted span
	23	Power supply	24 VDC
	24	Certification:	ATEX, II 1/2 G Ex db IIC T6…T4 Ga/Gb
Accessories	25	Manifold Supplier	EMERSON
	26	Manifold type / Model	5-Valves / R305RC52B11
	27	Manifold mat.l Body / seal	SS316 / PTFE
Purchase	28	Instrument Manufacturer	EMERSON
	29	Model	2051CD3A22A1KS5E8L4M5D4T1Q4Q8HR7
Notes	30		

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PRESSURE GAUGES			
General	1	Tag number	64-PI-054, 64-PI-055
	2	Service	PSA towers pressure
	3	Quantity	2
Process	4	Fluid	Air
	5	Operating pressure	9 barg
	6	Operating temperature	40°C
	7	Design pressure	12 barg
	8	Design temperature	80°C
	9	Area classification	Safe
	10	Ambient temperature	-8.4 ÷ 25°C
Gauge	11	Type	Bourdon Tube
	12	Range	0 ÷ 16 barg
	13	Mounting	Local
	14	Dial size	DN100 mm
	15	Dial / Pointer color / material	White / black / aluminum
	16	Case material	Stainless steel SS 316
	17	Ring material	Stainless steel SS 316
	18	Blow out protection	With solid baffle wall and blow-out back
	19	Lens material	Safety glass
	20	Pressure element type	Bourdon
	21	Pressure element material	SS 316L (1.4571)
	22	Socket material	Stainless Steel SS 316
	23	Movement material	Stainless Steel SS 316
	24	Connection size	1/2" NPT-M
	25	Connection type	Radial Bottom
	26	Protection degree	IP66
	27	Nominal accuracy	CLASS 1 EN837 - 1% on range
	28	Over pressure	30% of span
	29	Certification:	ATEX, Ex h Gas II 2G Ex h IIC T6 ...T1 Gb X
Accessories	30	Diaphragm seal	NO
	31	Manifold	2 Valves
Purchase	32	Instruments Manufacturer	WIKA
	33	Model	233.30
Notes	34		

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PRESSURE GAUGES			
General	1	Tag number	64-PI-058
	2	Service	Nitrogen receiver pressure
	3	Quantity	1
Process	4	Fluid	Nitrogen
	5	Operating pressure	8 barg
	6	Operating temperature	40°C
	7	Design pressure	12 barg
	8	Design temperature	80°C
	9	Area classification	Safe
	10	Ambient temperature	-8.4 ÷ 25°C
Gauge	11	Type	Bourdon Tube
	12	Range	0 ÷ 16 barg
	13	Mounting	Local
	14	Dial size	DN100 mm
	15	Dial / Pointer color / material	White / black / aluminum
	16	Case material	Stainless steel SS 316
	17	Ring material	Stainless steel SS 316
	18	Blow out protection	With solid baffle wall and blow-out back
	19	Lens material	Safety glass
	20	Pressure element type	Bourdon
	21	Pressure element material	SS 316L (1.4571)
	22	Socket material	Stainless Steel SS 316
	23	Movement material	Stainless Steel SS 316
	24	Connection size	1/2" NPT-M
	25	Connection type	Radial Bottom
	26	Protection degree	IP66
	27	Nominal accuracy	CLASS 1 EN837 - 1% on range
	28	Over pressure	30% of span
	29	Certification:	ATEX, Ex h Gas II 2G Ex h IIC T6 ...T1 Gb X
Accessories	30	Diaphragm seal	NO
	31	Manifold	2 Valves
Purchase	32	Instruments Manufacturer	WIKA
	33	Model	233.30
Notes	34		

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OXYGEN ANALYZER			
General	1	Tag number	64-AT-051
	2	Service	PSA Outlet oxygen content
	3	Quantity	1
Process	4	Fluid	Nitrogen
	5	Operating pressure	8 barg
	6	Operating temperature	40°C
	7	Design pressure	12 barg
	8	Design temperature	80°C
	9	Area classification	Safe
	10	Ambient temperature	-8.4 ÷ 25°C
Transmitter	11	Analog output	4÷20mA
	12	Digital interface	0% to 5%
	13	Calibrated Range	0% ÷ 5%
	14	Power supply	24 VDC
	15	Accuracy	±1 of span
	16	Repeatability	±0.2% of span
	17	Execution	IP66
	18	Enclosure	SS 316
	19	Warm-up time	30 minutes
	20	Certification:	ATEX, Ex II 2 GD Ex d IIc TC
Probe	21	Mounting	Local
Accessories	22	Digital display	No
	23	Isolation valves	YES
Purchase	24	Manufacturer	GE SENSING
	25	Model	XM02-7-CE-3-1-0 XCAL-3-1-1-1
Notes	26		

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SOLENOID VALVE			
General	1	Tag number	64-XY-051, 64-XY-052, 64-XY-053, 64-XY-054, 64-XY-055, 64-XY-056, 64-XY-057, 64-XY-058, 64-XY-059, 64-XY-060, 64-XY-061
	2	Service	Actuated valves command
	3	Type	Solenoid valve
Body	4	Material	SS 316
	5	Connections	1/4" NPT-F
	6	Seals	NBR
Acting	7	Ways/Position	3/2
	8	Type	UNIVERSAL
Coil	9	Power supply	24VDC
	10	Insulation class	H
	11	Protection degree	IP66
	12	Electrical connection	M20 x 1.5
	13	Power consumption	11W
Purchase	14	Manufacturer	NADI
	15	Model	C28I60D0C
	16	Certification	ATEX, Eexd IIC T6
Notes	17	Installed inside local control panel	

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SAFETY VALVE			
General	1	Tag number	64-PSV-051, 64-PSV-052
	2	Service	Vessel protection
	3	Quantity	2
	4	Type	Safety relief valve
Process	5	Fluid	N2
	6	Operating pressure	12 barg
	7	Operating temperature	40°C
	8	Design pressure	12 barg
	9	Design temperature	80°C
	10	Area classification	Safe
	11	Ambient temperature	-8.4 ÷ 25°C
Design	12	Design	2014/68/EU PED
	13	Code	ISO 4126-1
	14	Design case	Fire case
	15	Inlet connection	1” ANSI 150# RF
	16	Outlet connection	2” ANSI 150# RF
	17	Orifice designation	D
	18	Set pressure	12 barg
	19	Back pressure	0 barg
	20	Overpressure	10%
Materials	21	Diaphragm seal	NO
	22	Body	SS316
Purchase	23	Manufacturer	N.G.I.
	24	Model	G10-API
Notes	25		

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SAFETY VALVE			
General	1	Tag number	64-PSV-053, 64-PSV-054
	2	Service	N2 receiver protection
	3	Quantity	2
	4	Type	Safety relief valve
Process	5	Fluid	N2
	6	Operating pressure	12 barg
	7	Operating temperature	40°C
	8	Design pressure	12 barg
	9	Design temperature	80°C
	10	Area classification	Safe
	11	Ambient temperature	-8.4 ÷ 25°C
Design	12	Design	2014/68/EU PED
	13	Code	ISO 4126-1
	14	Design case	Fire case
	15	Inlet connection	2” ANSI 150# RF
	16	Outlet connection	3” ANSI 150# RF
	17	Orifice designation	J
	18	Set pressure	12 barg
	19	Back pressure	0 barg
	20	Overpressure	10%
Materials	21	Diaphragm seal	NO
	22	Body	SS316
Purchase	23	Manufacturer	N.G.I.
	24	Model	G32-API
Notes	25		

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ACTUATED VALVES			
General	1	Tag number	64-XV-051, 64-XV-052, 64-XV-053, 64-XV-054
	2	Service	ON-OFF actuated valves
	3	Quantity	4
	4	Type	Ball valve
Process	5	Fluid	N2
	6	Operating pressure	12 barg
	7	Operating temperature	40°C
	8	Design pressure	12 barg
	9	Design temperature	80°C
	10	Area classification	Safe
	11	Ambient temperature	-8.4 ÷ 25°C
Body	12	Size	1”
	13	Rating	150#
	14	End connections	RF
	15	Material	A351 CF8M
	16	Ball	SS 316
	17	Seat	FKM+GRAPHITE
Actuator	18	Type	RACK & PINION
	19	Fail position	CLOSE
Purchase	20	Manufacturer	VALPRES
	21	Model	ART.68J000
Notes	22		

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ACTUATED VALVES			
General	1	Tag number	64-XV-055, 64-XV-056, 64-XV-057, 64-XV-058, 64-XV-059
	2	Service	ON-OFF actuated valves
	3	Quantity	6
	4	Type	Ball valve
Process	5	Fluid	N2
	6	Operating pressure	12 barg
	7	Operating temperature	40°C
	8	Design pressure	12 barg
	9	Design temperature	80°C
	10	Area classification	Safe
	11	Ambient temperature	-8.4 ÷ 25°C
Body	12	Size	1”
	13	Rating	150#
	14	End connections	RF
	15	Material	A352 LCC
	16	Ball	A352 LCC
	17	Seat	FKM+GRAPHITE
Actuator	18	Type	RACK & PINION
	19	Fail position	CLOSE
Purchase	20	Manufacturer	VALPRES
	21	Model	ART.68J000
Notes	22		

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ACTUATED VALVES			
General	1	Tag number	64-XV-060, 64-XV-061
	2	Service	ON-OFF actuated valves
	3	Quantity	2
	4	Type	Ball valve
Process	5	Fluid	N2
	6	Operating pressure	12 barg
	7	Operating temperature	40°C
	8	Design pressure	12 barg
	9	Design temperature	80°C
	10	Area classification	Safe
	11	Ambient temperature	-8.4 ÷ 25°C
Body	12	Size	1”
	13	Rating	150#
	14	End connections	RF
	15	Material	A352 LCC
	16	Ball	A352 LCC
	17	Seat	FKM+GRAPHITE
Actuator	18	Type	RACK & PINION
	19	Fail position	OPEN
Purchase	20	Manufacturer	VALPRES
	21	Model	ART.68J000
Notes	22		

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