JTL TRANSCRITICAL CO2 VALVE AND GAS COOLER CONTROLLER ITEM NUMBERS

HP350

CONTENTS

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ITEM	DESCRIPTION	CODE	CODE MEANING	RANGE	ITEM 9 VALUE
1. Jnet NETWORK IDENTIFICATION					
0	Unit type	hP35	Unit type		
19	Software version number				
1	Unit number			0.1 - 899.9	
2. PRESSURES Note: Pressures are shown in psi Average pressures are averaged over last hour and are updated every 4 minutes. Pressures can be displayed on the Maintenance Unit in psi, bar or MPa. The choice is made on item 9393.					
2.1 COOLER EXIT PRESSURE					
22	Cooler exit pressure (up to v0.01.0)				
24	Cooler exit pressure (from v0.01.1)				
148	Average cooler exit pressure over 1 hour				
122	Cooler exit pressure transducer selection	OFF d.t.En/C.E.En	Disabled Enabled	0 - 1	d.t.En/C.E.En
422	Full scale transducer value (at 20mA)			1450 - 1750	1740
101	Member of data set 1	0	disabled	0 - 9999	0
102	Member of data set 2	0	disabled	0 - 9999	0
2.2 COOLER INLET PRESSURE (from v0.01.1)					
23	Cooler inlet pressure				
149	Average inlet pressure over 1hour				
123	Cooler inlet pressure transducer selection	oFF C.i.En	Disabled Enabled	0 - 1	C.i.En
423	Full scale transducer value (at 20mA)			1450 - 1750	1740
103	Member of data set 1	0	Disabled	0 - 9999	0
104	Member of data set 2	0	Disabled	0 - 9999	0
2.3 COOLER CONTROL PRESSURE (from v0.01.1)					
22	cooler control pressure			0 - 100	50
65	Cooler control pressure calculation method	0 C.E.Pr 1 C.i.Pr 2 C.C.Pr	Cooler exit Cooler inlet Mixture of exit & inlet	0 - 2	C.E.Pr
66	Cooler control pressure ratio		0% - cooler exit 100% - cooler inlet	0 - 100	50
25	Cooler inlet to exit differential pressure				

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ITEM	**DESCRIPTION**	**CODE**	**CODE MEANING**	**RANGE**	**ITEM 9 VALUE**
3. PRESSURE ALARMS					
3.1 SUBCRITICAL COOLER PRESSURE					
52	High cooler pressure alarm level			725 - 1200	1000
51	Low cooler pressure alarm level			300 - 600	500
3.2 SUPERCRITICAL COOLER PRESSURE					
62	High cooler pressure alarm level			1200 - 1600	1450
61	Low cooler pressure alarm level			600 - 1200	800
3.3 COOLER INLET PRESSURE (from v0.01.1)					
72	High cooler inlet pressure alarm level			1200 - 1600	1450
71	Low cooler inlet pressure alarm level			200 - 650	300
3.4 COOLER DIFFERENTIAL PRESSURE (from v0.01.1)					
69	High cooler differential pressure alarm level	0	Disabled	0 - 500	75
4. TEMPERATURES Note: Temperatures are shown is Celsius. Temperatures can be displayed on the Maintenance Unit in Celsius or Fahrenheit. The choice is made on item 9392.					
9392	Temperature display choice	CELS FAhr	Celsius Fahrenheit	0 - 1	CELS
31	Cooler exit temperature				
131	Cooler exit temperature Sensor enable	OFF t1.En	Not selected Selected	0 - 1	t1.En
32	Ambient temperature				
132	Outside air temperature sensor enable	OFF t2.En	Not selected Selected	0 - 1	t2.En
139	Select primary outside temperature source (from v0.00.5)	L.t.bu E.t.Sn	Local Network	0 - 1	L.t.bu
136	Met Office temperature preferred for outside ambient temperature (from v0.01.5)	L.t.Pr F.t.Pr	Local temperature Met Office	0 - 1	L.t.Pr
39	Ambient temperature difference error (from v0.01.2)			3 - 10	5
897	Site temperature (from broadcast)				
898	Site relative humidity (from broadcast)				
896	Site absolute humidity (from broadcast)				
899	Outside temperature				
820	Outside ambient temperature from the Met Office (from v0.01.3)				
821	Time since data from the Met Office received from the network controller (from v0.01.3)				
822	Mett Office temperature trend (from v0.01.7)	OFF F.t.t.u	Disabled Enabled	0 - 1	OFF

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ITEM	**DESCRIPTION**	**CODE**		**CODE MEANING**	**RANGE**	**ITEM 9 VALUE**
5. CO2 STATE CONTROL						
20	Operating state	0 1 2	oFF Subc SuPr	Manual Subcritical Supercritical		
36	Adjusted ambient temperature factor (Item calculated as a value between ambient and cooler exit temperature using this factor)				0 - 50	0
37	Adjusted ambient setpoint				21 - 27	25.0
38	Adjusted ambient deadband				1 - 4	2.0
35	Adjusted ambient temperature (calculated from the ambient and cooler exit temperature)					
6. PRESSURE CONTROL						
50	Minimum pressure setpoint				575 - 725	650
350	Maximum pressure set point				1300 - 1600	1375
370	Operational pressure set point					
73	Maximum cooler inlet pressure (from v0.01.1)				1200 - 1500	1377
74	Minimum cooler exit pressure (from v0.01.1)				500 - 600	507
67	Cooler pressure safety strategy (from v0.01.1)	0 1 2	C.E.Pr C.i.Pr both	Cooler exit Cooler inlet Both	0 - 2	C.E.Pr
22	Cooler exit pressure (up to v0.01.0)					
24	Cooler exit pressure (from v0.01.1)					
55	Cooler exit pressure safety level to reduce capacity				1200 - 1600	1450
23	Cooler inlet pressure (from v0.01.1)					
68	Cooler inlet pressure safety level to reduce capacity (from v0.01.1)					

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ITEM	DESCRIPTION	CODE	CODE MEANING	RANGE	ITEM 9 VALUE
6.1 SUBCRITICAL PRESSURE CONTROL In subcritical mode the cooler acts as a conventional condenser where the transcritical valve speed is controlled by PI control against an optimised pressure setpoint calculated using the external ambient temperature and for the condenser and the design differential temperature for the condenser.					
363	Floating temperature differential			5 - 15	7.0
364	Floating temperature setpoint				
365	Operating temperature				
375	Valve gain			up to v0.01.1 5 - 200 from v0.01.2 1 - 200	25
374	Valve control time constant			1 - 250	30
6.2 SUPERCRITICAL PRESSURE CONTROL In supercritical mode the transcritical valve is controlled by PI control against a calculated pressure setpoint calculated using a formula which takes a multiple of the external ambient temperature and adds a constant.					
63	OAT multiplier			0 - 30	15
64	OAT constant			400 - 1400	700
377	Valve gain			up to v0.01.1 5 - 200 from v0.01.2 1 - 200	10
376	Valve time constant			1 - 250	10
6.3 HIGH PRESSURE VALVE OUTPUT					
371	Output (%)	0 - 100			
194	Cooler pressure control proportional term (P)				
192	Cooler pressure control integral term (I)				
380	Pressure difference to allow valve to shut (from v0.01.2)			15 - 75	29
381	Minimum valve opening (%) (from v0.01.2)			0 - 25	10
382	Current minimum valve opening (from v0.01.2)				
378	Maximum valve opening (%) (from v0.01.2)			50 - 100	100
372	Forced output			0 - 100	
379	Valve output smoothing	0	disabled	0 - 5	3

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ITEM	**DESCRIPTION**	**CODE**	**CODE MEANING**	**RANGE**	**ITEM 9 VALUE**
7. COOLER EXIT TEMPERATURE CONTROL					
140	Cooler exit temperature setpoint				
339	Maximum gas cooler exit temperature (from v0.01.2)			35 - 40	35
338	Minimum gas cooler exit temperature (from v0.01.2)			5 - 15	10
143	Minimum cooler exit temperature differential			0 - 10.0	5.0
31	Cooler exit temperature				
151	Cooler exit temperature error				
152	Average cooler exit temperature error				
153	Cooler exit temperature tolerance			0 - 5.0	2.0
154	Cooler exit temperature alarm period			00.00 - 06.00	60
7.1 SUBCRITICAL COOLER EXIT TEMPERATURE CONTROL In subcritical mode the cooler fans are controlled by PI control against a calculated temperature setpoint which endeavouring to maintain the liquid level at a set level of subcooling.					
141	Cooler superheat (sub cooling)				
144	Cooler subcooling setpoint			0 to -10	0.0
138	Control Strategy (from v0.00.6)	0 E.t.C.P 1 E.t.A.t 2 E.t.C.S	Condenser pressure Ambient temperature Condenser pressure setpoint	v0.00.6 to v0.00.8	
				0 - 1	E.t.C.P
				from v0.00.9	
				0 - 2	E.t.C.P
22	Cooler pressure				
395	Fan speed gain			up to v0.00.4	
				5 - 200	10
				from v 0.00.5	
				1 - 200	5
54	Fan speed time constant			1 - 250	10
7.2 SUPERCRITICAL COOLER EXIT TEMPERATURE CONTROL In supercritical mode the cooler acts as a gas cooler where the fan speed is controlled by PI control against a calculated temperature setpoint calculated using a formula which takes a multiple of the external ambient temperature and adds a constant.					
146	OAT multiplier			1.0 - 1.6	1.0
147	OAT constant			0 - 10	4.0
396	Fan speed gain			up to v0.00.4	
				5 - 200	25
				from v 0.00.5	
				1 - 200	5
56	Fan speed control time constant			1 - 250	10

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ITEM	DESCRIPTION	CODE	CODE MEANING	RANGE	ITEM 9 VALUE
	7.3 COOLER FAN OUTPUT Forced functions remain forced if the Maintenance Unit remains plugged in. They are automatically cancelled 30 minutes after the Maintenance Unit is unplugged.				
391	Output (%)	0 - 100			
193	Cooler temperature integral term (I)				
195	Cooler temperature proportional term (P)				
359	Maximum fan speed (%)			50 - 100	100
368	Maximum speed at night (%)			50 - 100	100
369	Select network timer for nightime operation	0 1 - 8	Disabled Timer number	0 - 8	0
360	Maximum fan speed reduction temperature profile high value			up to v0.00.3	
				5 - 20	15
				from v0.00.4	
				0 - 20	5
361	Maximum fan speed reduction temperature profile low value			up to v0.00.3	
				-5 - 10	5
				from v0.00.4	
				-10 - 10	-5
362	Current maximum fan speed due to temperature profile				
327	Minimum fan speed reduction temperature profile high value (from v0.01.5)			0 - 25	15
328	Minimum fan speed reduction temperature profile low value (from v0.01.5)			-10 - 10	0
358	Minimum fan speed (%) (up to v0.01.3)			up to v0.00.3	
	Minimum subcritical fan speed (%) (from v0.01.4)			0 - 25	0
				from v0.00.4	
				0 - 25	20
329	Compressor capacity loaded to increase fan speed by 1% in subcritical mode (kW) (from v0.01.5)			0 - 20	5
351	Minimum supercritical fan speed (%) (from v0.01.4)			0 - 50	30
352	Fan speed increase per compressor stage in supercritical mode (%) (v0.01.4)			0 - 20	10
	Compressor capacity loaded to increase fan speed by 1% in supercritical mode (kW) (from v0.01.5)			0 - 20	5
340	Number of compressor stages running (v0.01.4)				

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ITEM	DESCRIPTION	CODE		CODE MEANING	RANGE	ITEM 9 VALUE
341	Compressor stages member of data set (v0.01.4)				0 - 9999	0
342	Compressor stages received from unit number (v0.01.4)					
324	Compressor capacity loaded (from v0.01.5)					
325	Compressor capacity loaded member of data set (from v0.01.5)				0 - 9999	0
326	Compressor capacity loaded of received from unit number (from v0.01.5)					
323	Default compressor capacity loaded. (From v0.01.7)				0 - 500	100
357	Discharge pressure cut out (depends on item 358 being >0)				500 - 700	600
353	Current minimum fan speed (%) (from v0.00.4)					
354	Upper limit for minimum fan speed (%) (from v0.00.4)				0 - 40	30
349	Pressure differential for fan speed adjustment (from v0.01.2)				15 - 75	15
355	Rate of change of minimum fan speed adjustment (%/4 secs) (from v0.00.4)				0 - 1.0	0.1
345	Cooler pressure to override maximum fan speed strategy (from v0.01.2)	0 1 2	C.E.Pr C.i.Pr both	Cooler exit Cooler inlet Both	0 - 2	C.E.Pr
346	Cooler pressure to override maximum fan speed (from v0.01.2)				1200 - 1500	1377
347	Rate of change of maximum fan speed in override (%/4secs) (from v0.01.2)	0		Function disabled	0 - 1.0	0.1
348	Current maximum fan speed (from v0.01.2)					
356	Fan control strategy when transcritical valve closed.	0 1 2	run or oFF St.Fn Lo.Fn	Run normally Stop fans Run fans at minimum speed	up to v0.00.8 0 - 1 from v0.00.9 0 - 2	 oFF run or oFF
397	Backup output (%)				0 - 100	100
392	Forced output (%)				0 - 100	
388	Fan output voltage for zero speed (from v0.01.2)				0.0 - 2.0	0.0
393	Input status	Fn.Ft Hty		Fan Fault Fan ok		
389	Fan output smoothing	0		Disabled	0 - 5	3

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ITEM	**DESCRIPTION**	**CODE**	**CODE MEANING**	**RANGE**	**ITEM 9 VALUE**
8. ADIABATIC COOLING CONTROL (from v0.01.2)					
5170	Enable adiabatic cooling	oFF A.C.En	Disabled Enabled	0 - 1	oFF
5171	Minimum off time (mins)			2 - 10	5
5172	Minimum runt time (mins)			5 - 30	10
5173	Minimum ambient temperature to allow adiabatic cooling to run			v0.01.2 → v0.01.4	
				2 - 10	5
				from v0.01.5	
				25 - 35	31
5174	Gas cooler exit temperature error to run adiabatic cooling			1 - 5	3
5175	Adiabatic cooling trigger delay (mins)			1 - 10	5
5176	Adiabatic equipment fault input delay time (from v0.01.5)	0	Disabled	0 - 20	10
5180	Period between automatic test (weeks)	0	Tests disabled	0 - 4	2
5181	Automatic test day of week		0 - Sunday	0 - 6	Mon
5182	Automatic test time of day			00:00 to 23:59	12:00
5183	Automatic test repeat cycles			0 - 5	0
5184	Force test	oFF F.tSt	Off Run test	0 - 1	
5185	Time since cooling last ran				
5186	Minimum ambient temperature to allow testing (from v0.01.5)			2 - 10	5

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ITEM	DESCRIPTION	CODE	CODE MEANING	RANGE	ITEM 9 VALUE
		9. INPUTS AND OUTPUTS			
20	Operating mode	oFF Subc SuPr	Manual Subcritical Supercritical		
170	Inputs	Graphical	See display data bit1 = input 1		
171	Auto/manual (IP-1)	OFF Auto	Manual controller dormant Auto mode		
172	Adiabatic cooling system healthy (IP-2) (from v0.01.2)	A.C.Ft Hty	Fault Healthy		
173	Fans healthy (IP-3)	Fn.Ft Hty	Fan fault Fans ok		
174	Transcritical valve healthy (IP-4)	tn.Ft Hty	Valve fault Valve ok		
160	Outputs	Graphical	See display data bit1 = output 1		
161	Adiabatic system control (LN/LD1) (from v0.01.2)	OFF En.A.C	Off Enable Adiabatic system		
162	HP valve state (LN/LD-2)	Clr En.H.P	Off HP valve enabled		
163	Watchdog output (LN/LD-3)	OFF On	Watchdog valve Watchdog healthy		
164	High discharge pressure (LN/LD-4)	clr Hi.dP	Discharge ok High pressure		
		10. CLOCK CALENDAR Note, the time and date can be displayed as standard or daylight saving (summer) time. This choice is made on item 18. When daylight saving is chosen and the controller is connected to a JTL Network Controller supporting daylight saving operation, the change is made automatically to the current EU directive.			
2	Time of day			00:00 - 23:59	
3	Day of week				
4	Date			01:01 - 31:12	
5	Year			2018 - 2048	
18	Daylight saving enable	Stnd dAY.S	Standard time Daylight saving time	0 - 1	Stnd
		11. DISPLAY FUNCTIONS			
9392	Temperature display unit choice	CELS FAhr	Celsius Fahrenheit	0 - 1	Cels
9393	Pressure display unit choice	0 PASC 1 PSI 2 bAr 3 KPA 4 bArA	MPa p.s.i bar kPa Bar absolute	0 - 4	psi
189	Backlight control	0 B.oFF 1 BL.on 2 BL.F.F 3 BL.n.F	Backlight off Backlight on Backlight off, flashes for alarm Backlight on, flashes for alarm	0 - 3	B.oFF

ITEM	DESCRIPTION	CODE	CODE MEANING	RANGE	ITEM 9 VALUE
12. RESTORE FACTORY DEFAULTS					
966	Virtual bitswitch setting				
9	Set default values To set the factory defaults into the memory of the controller, set item 9 to the set default value of "1234". This should be done on initial commissioning of the unit or when the unit is being installed as a replacement part.	1234 1066	Load default settings Write to NVRAM immediately		
13. RESTORE PARAMETERS FROM NETWORK To restore the data from the network first set the virtual bitswitch on item 966 and the appropriate unit number on item 1. Then check item 965 to see if this facility is available on the network. The information on item 965 is received from a network broadcast every few minutes. If the restore parameter facility is available and operational then item 965 will be set to a non zero number e.g. 2. To request restore parameters set item 964 to 1234. Item 963 displays parameters restore progress. When all parameters are downloaded item 964 is cleared to 0.					
965	Master database port	0 1 - 4	Not in use NC port no		
964	Set restore parameters from network	1234	Request restore		
963	Parameter restore progress	rdy dnl.r din.p dnl.c FAIL	Restore function possible Restore requested Restore in progress Restore complete Restore fault		
959	Requested template	0 1-9999	As commissioned Template number	0 - 9999	
14. SYSTEM ALARMS					
80	Group alarm 81 - 88	Graphical	See display data		
83	Low cooler exit pressure	CLr Lo.dP	No fault Fault		
84	High cooler exit pressure	CLr Hi.dP	No fault Fault		
87	High cooler exit temperature	CLr Hi.C.E	No fault Fault		
88	Cooler fault	CLr Fn.Ft	No fault Fault		
90	Group alarm 91 - 98	Graphical	See display data		
91	Pressure transducer fault	CLr Pt.Ft	No fault Fault		
92	Temperature sensor fault	CLr th.Ft	No fault Fault		
93	High cooler pressure differential fault (from v0.01.1)	CLr Hi.C.d	No fault Fault		
95	Adiabatic cooling fault (from v0.01.5)	Clr A.C.Ft	No fault Fault		
98	High ambient temperature differential (from v0.01.2)	Clr A.t.d.E	No fault Fault		
910	Group alarm 911-918	Graphical	See display data		

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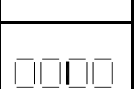
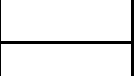
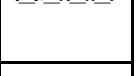
ITEM	**DESCRIPTION**	**CODE**	**CODE MEANING**	**RANGE**	**ITEM 9 VALUE**
915	Plant fault	CLr P.Flt	No Fault Fault		
15. DIAGNOSTIC & TEST FUNCTIONS					
6	JTL Network communications speed	4.8	Kilo Baud		
7	Communications method	HALF	2 wire		
8	Bitswitch setting				
954	Current zone no				
967	Latest unit no polled on zone				
973	Latest polling interval This time shows the polling interval between the last two untimed broadcast messages.	min:sec			
974	Time since last awake message	min:sec			
99	Test digital displays	CLr SEt	Not active Test active	0 - 1	
100	Test inputs	Graphical	See display data		
199	Test relay outputs	clr SEt	Not active Active	0 - 1	
411	Transducer 1 reading				
412	Transducer 2 reading				
431	Sensor 1 reading				
432	Sensor 2 reading				
10	Processor alarms (11 - 17)	Graphical	See display data		
14	Background loop fault (from v0.01.5)	Clr bL.Ft	No Fault Fault		
16	Non volatile memory fault	Clr n.Ft	No Fault Fault		

DISPLAY DATA	HP350
NORMAL DISPLAY	
999.9	Pressure in bar
–	Not selected
ALARM TEXT (in descending priority order)	
Hi.dP	High cooler exit pressure
FAn	Cooler fan problem
OTHER TEXT	
JTL	Start-up text

Graphical Display of Bit Data			
Graphical display of bit data used on items where the data was shown previously as a decimal value.	Bit	Graphic	
	None		
	1		
	2		
	3		
	4		
	5		
	6		
	7		
	8