

Test Summary for DL 305

RF radiated emissions EN50081-1 (EN55022 class B)
EN50081-2 (EN55011 group 1, class A)

Test A

RF emissions from fully power loaded systems using basic digital I/O without intelligent, communications, or analogue modules. Highest emissions recorded are listed below.

Product	UK test site @ 3m aerial distance					Limits EN 50081	
	Freq. MHz	Ant. v/h	Peak dBuV	Ave dBuV	Quasi Peak	-1 dBuV	-2 dBuV
D3-340(E-RB-5) + relay modules, 5 slot AC base	109	h	24	14	20	47 pk.	57 q.p.
D3-340(E-RB-5) + relay modules, 10 slot AC base	109	h	18	10	14	:	:
D3-340(E-RB-5) + relay modules, 5 slot DC base	109	h	22	13	18	:	:
D3-340(E-RB-5) + relay modules, 10 slot DC base	109	h	18	7	13	40 pk.	50 q.p.

Note: All emissions were primarily from the D3-232-DCU(E-03DM) unit, which was used to power load the base.

Test B

RF radiated emissions from fully loaded AC powered systems using speciality, communications, and analogue I/O modules that contain micro processors, but without external cable connections.

Product	UK test site @ 3m aerial distance					Limits EN 50081	
	Freq. MHz	Ant. v/h	Peak dBuV	Ave dBuV	Quasi Peak	-1 dBuV	-2 dBuV
D3-340 (E-RB-5) system with 10 slot AC base, and including analog modules.	98	v	15	-	-	40 pk.	50 q.p.
D3-330 (SR-22) system with 10 slot AC base, and including D3-HSC((E-01Z), F3-AB128-T, D3-TCSU(F-10D), D3-HP(R-23P) + analogue modules	69	h	24	-	-	47 pk.	57 q.p.

Test C

Secondary RF radiated emissions from Cabling and Operator Interfaces.

Product	UK test site @ 3m aerial distance					Limits EN 50081	
	Freq. Mhz	Ant. v/h	Peak dBuV	Ave dBuV	Quasi Peak	-1 dBuV	-2 dBuV
Mains cabling							
- restricted to within cabinet	90	h	10	-	-	:	:
- 2 metres in open air	90	h	20	-	-	:	:
- 2 m in steel trunking	90	h	9	-	-	:	:
- in trunking with bond wire	90	h	5	-	-	:	:
- 2m in flex steel conduit	90	h	2	-	-	:	:
Cabling to DC o/p							
- open twisted pair	90	h	7	3	-	:	:
- as above + ferrite beads	90	h	6	2	-	:	:
- in steel trunking	90	h	5	1	-	:	:
- background with PLC off	90	h	3	1	-	:	:
- with adjacent earth wire	90	h	12	6	-	:	:
CPU port cables							
Hand programmer							
- with standard cable	83	h	26	-	-	:	:
- as above, with ferrite beads	83	h	9	-	-	:	:
OP-1500 terminal							
- with standard cable	129	h	12	7	-	:	:
- as above, with ferrite beads	129	h	7	2	-	:	:
DCM to FA-UNICON							
CPU to UNICON							
- unscreened cable	88	h	14	11	-	:	:
Belden 9855 DCM							
- to UNICON screened cable	113	h	16	10	-	:	:
Belden cable							
- as above with ferrite beads	113	h	15	8	-	:	:
Analog modules							
- twisted pair cabling	86	h	11	7	-	:	:

Comments

No special measures required with basic, speciality, or analogue PLC equipment. Average and QP readings were not recorded as peak levels below limits.

No problems with emissions from various arrangements of AC power cabling, or from the cabling to the auxiliary DC output supply.

When using Belden cabling in a network emissions are high. Therefore, all recommended Belden cabling, and therefore all network cabling, must be run through steel trunking in a factory, with earth bond wires between control cabinets, and cable screens bonded to control cabinet framework at both ends of cable.

Of particular importance is that when submitting machinery to a test house for approval network and serial communications cabling must be double screened, with the screen earthed to machine frame and ground plane at the

remote end, and the cables must be run in flexible steel trunking to outside the test area.

RF conducted emissions from AC power leads

EN50081-1 (EN55022 Class B), EN50081-2 (EN55011 group 1, Class A)
Highest emissions recorded listed below, with all systems fully power loaded.

Product	Spectrum Analyser + LISN					Limit EN 50081	
	Freq.khz	Peak	Ave.	PRF	Q.Peak	-1	-2
D3-05B(E-02B) - without filter	330	88	71	1500	84	66q.p., 56	79q.p., 66
	1250	82	-	-	-	ave.	ave
D3-05B(E-02B) - with FN 2080-1/06 filter	330	<30	-	-	-	56 q.p., 46	73 q.p., 60
	1250	<30	-	-	-	ave.	ave.
D3-10B(E-04B) - without filter	480	89	80	2500	80	:	:
	1000	85	-	-	-	:	:
D3-10B(E-04B) - with FN 2080-1/06 filter	480	65	55	2500	64	:	:
	1000	<30	-	-	-	:	:

A schaffner AC power line filter type FN 2080 1/06, or equivalent, is required in order to utilise the above equipment in the domestic and industrial environments.

RF radiated immunity

EN50082-1 (IEC 801-3 criteria A), EN50082-2 (ENV50140, ENV50204)
Passed in UK test facility using BCI test method.

RF conducted immunity

EN50082-2 (EN50141 criteria A)
Passed both domestic and industrial limits for signal, control, and power lines by the BCI test method when PLC mounted as a system onto a steel base plate, with cabling run parallel to, and no greater than 100mm above the base plate, in order to simulate cabling mounted in plastic trunking within a control cubicle.

Effect of RF field on analogue modules

Apparatus utilising the following analogue modules must accept the FS errors highlighted below, and operate within their specification to criteria A (no effect).
Bulk Current Injection method, used with twisted pair unscreened cabling.

Device	Mode V I	Input Earth	RF Noise	links	Nom. Value	min	max	FS Error
F3-08AD		✓	x	x	3967	3965	3968	0.05%
F3-08AD		✓	✓	x	3967	3963	3977	0.24%
F3-08AD		x	x	x	125	124	126	0.02%

Device	Mode V I	Input Earth	RF Noise	links	Nom. Value	min	max	FS Error
F3-08AD		x	✓	x	125	119	137	0.29%
F3-08AD		x	x	x	2048	2048	2049	0.02%
F3-08AD		x	✓	x	2048	2045	2060	0.29%
F3-08AD		x	x	x	3966	3965	3968	0.05%
F3-08AD		x	✓	x	3966	3959	3988	0.54%
F3-08AD		✓	x	x	2049	2048	2050	0.02%
F3-08AD		✓	✓	x	2049	2047	2057	0.20%
F3-08AD		✓	x	x	126	125	127	0.02%
F3-08AD		✓	✓	x	126	119	136	0.24%
F3-04AD	✓ x	x	x	x	127	97	150	0.73%
F3-04AD	✓ x	x	✓	x	127	97	154	0.73%
F3-04AD	✓ x	✓	x	x	128	128	128	0.00%
F3-04AD	✓ x	✓	✓	x	128	124	128	0.10%
F3-04AD	✓ x	✓	x	- to 0v	128	128	128	0.00%
F3-04AD	✓ x	✓	✓	- to 0v	128	128	128	0.00%
F3-04AD	✓ x	x	x	- to 0v	128	128	128	0.00%
F3-04AD	✓ x	x	✓	- to 0v	128	128	129	0.02%
F3-04AD	x ✓	x	x	- to 0v	203	203	203	0.00%
F3-04AD	x ✓	x	✓	- to 0v	203	203	203	0.00%
F3-04AD	x ✓	✓	x	- to 0v	203	203	203	0.00%
F3-04AD	x ✓	✓	✓	- to 0v	203	203	203	0.00%
F3-04AD	x ✓	x	x	x	203	153	204	1.22%
F3-04AD	x ✓	x	✓	x	203	153	204	1.22%
F3-04ADS	✓ x	x	x	x	2048	2047	2050	0.05%
F3-04ADS	✓ x	x	✓	x	2048	2038	2056	0.24%
F3-04ADS	x ✓	x	x	x	2046	2045	2047	0.02%
F3-04ADS	x ✓	x	✓	x	2046	2038	2054	0.20%
F3-08THM		x	x	x	719	719	720	0.02%
F3-08THM		x	✓	x	723	722	726	0.07%
F3-08THM		x	x	com to -	723	723	723	0.00%
F3-08THM		x	✓	com to -	723	723	726	0.07%
F3-08THM		✓	x	com to -	721	721	722	0.02%
F3-08THM		✓	✓	com to -	722	722	723	0.02%
F3-08TEMP	✓	x	x	x	2048	2047	2048	0.02%
F3-08TEMP	✓	x	✓	x	2048	2047	2058	0.24%
F3-08TEMP	✓	✓	x	com to earth	2048	2047	2049	0.02%
F3-08TEMP	✓	✓	✓	com to earth	2048	2047	2057	0.22%

50Hz magnetic field immunity

EN50082-2 (EN61000-4-8 criteria A)

Not applicable as there are no susceptible components.

Voltage dips and interruptions

EN50082-2, [EN61000-4-11 criteria B (10mS), C (100mS)]

All systems tested when fully loaded and operational. All systems withstand 30% power drop for 10mS, 60%/100mS requirements to criteria A. DC powered systems withstand 100% interruption at 100mS with no effect on operation (criteria A). Well within requirements. Voltage interruption for 5 seconds in both AC and DC powered systems causes controlled power down and power up to criteria B.

ESD immunity of enclosure port

EN50082-1 (IEC 801-3) - (8kv air, criteria B)

EN50082-2 (EN61000-4-2), - (4kv contact, 8kv air, criteria B)

Fast transient /burst immunity

EN50082-1 (IEC 801-4), (0.5kv signal, control DC lines, 1kv AC lines, criteria B), EN50082-2 (EN61000-4-4), (1kv signal, 2kv measurement, control, DC, AC lines, criteria B)

Device	pol	Port	ESD 8kv Air	Burst Transients (KV)				Function check and comments
D3-05B(E-02B)	+	live	✓	✓	✓	✓	✓	CPU main immunity program
D3-05B(E-02B)	-	live	✓	✓	✓	✓	✓	:
D3-05B(E-02B)	+	neutral		✓	✓	✓	✓	:
D3-05B(E-02B)	-	neutral		✓	✓	✓	✓	:
D3-05B(E-02B)	+	earth		✓	✓	✓	✓	:
D3-05B(E-02B)	-	earth		✓	✓	✓	✓	:
D3-05B(E-02B)	+	DC out		✓	✓	✓	✓	:
D3-05B(E-02B)	-	DC out		✓	✓	✓	✓	:
D3-10B(E-04B)	+	live	✓	✓	✓	✓	✓	:
D3-10B(E-04B)	-	live	✓	✓	✓	✓	✓	:
D3-10B(E-04B)	+	neutral		✓	✓	✓	✓	:
D3-10B(E-04B)	-	neutral		✓	✓	✓	✓	:
D3-10B(E-04B)	+	earth		✓	✓	✓	✓	:
D3-10B(E-04B)	-	earth		✓	✓	✓	✓	:
D3-10B(E-04B)	+	DC out		✓	✓	✓	✓	:
D3-10B(E-04B)	-	DC out		✓	✓	✓	✓	:
D3-05BDC(E-02B-C)	+	DC in	✓	✓	✓	✓	✓	:
D3-05BDC(E-02B-C)	-	DC in	✓	✓	✓	✓	✓	:
D3-10BDC(E-04B-C)	+	DC in	✓	✓	✓	✓	✓	:
D3-10BDC(E-04B-C)	-	DC in	✓	✓	✓	✓	✓	:
D3-340(SR-23A) - checked using OP-1500 plus OP-3CBL	+	top RS232		✓	✓	✓	✓	Tx/Rx lights flash. All lights flash at 4kv, which is stopped by ferrite bead on cable.
D3-340(SR-23A) - with OP-1500	-	top RS232	✓	✓	✓	✓	✓	:
D3-340(SR-23A) - with OP-1500	+	bottom RS232		✓	✓	✓	✓	:
D3-340(SR-23A) - with OP-1500	-	bottom RS232		✓	✓	✓	✓	:
D3-330P(SA-22) with D3- HPP and D3-HPCBL-1	+	cable	✓	✓	✓	✓	✓	CPU main immunity program
D3-330P(SA-22) with D3-	-	cable	✓	✓	✓	✓	✓	:

Device	pol	Port	ESD 8kv Air	Burst Transients (KV)				Function check and comments
				0.5	1	2	4	
HPP and D3-HPCBL-1 D3-330(SR-22) with D3- D4-BATT(RB-5), D3-HP(R-23P) and D3- HPCBL(E-15PJ-1)	+	cable	✓	✓	✓	✓	✓	:
D3-330(SR-22) with D3- D4-BATT(RB-5), D3-HP(R-23P) and D3- HPCBL(E-15PJ-1)	-	cable	✓	✓	✓	✓	✓	:
F3-RTU-1	+	port 2 RS232	✓	✓	✓	✓	✓	:
F3-RTU-1	-	port 2 RS232	✓	✓	✓	✓	✓	:
F3-RTU-1	+	port 1 RS422		✓	✓	✓	✓	:
F3-RTU-1	-	port 1 RS422		✓	✓	✓	✓	:
F3-OMUX-1	+	port 1 RS232	✓	✓				interference caused to operation - unit recovers
F3-OMUX-1	-	port 1 RS232	✓	✓				:
F3-OMUX-1	+	port 2 RS422		✓				:
F3-OMUX-1	-	port 2 RS422		✓				:
F3-OMUX-2	+	port 1 RS422	✓	✓				:
F3-OMUX-2	-	port 1 RS422	✓	✓				:
F3-OMUX-2	+	port 2 RS422		✓				:
F3-OMUX-2	-	port 2 RS422		✓				:
F3-OMUX-3	+	port 1 RS232	✓	✓				:
F3-OMUX-3	-	port 1 RS232	✓	✓				:
F3-OMUX-3	+	port 2 RS422		✓				:
F3-OMUX-3	-	port 2 RS422		✓				:
F3-PMUX	+	cable	✓	✓	✓	✓		lights flash, unit recovers
F3-PMUX	-	cable	✓	✓	✓	✓		:
F3-AB128	+	port 1 RS422	✓	✓	✓	✓	✓	jumps out of run - recovers
F3-AB128	-	port 1 RS422	✓	✓	✓	x	x	Autostart program corrupted.
F3-AB128	+	port 2 RS232		✓	✓	✓	✓	OK
F3-AB128	-	port 2 RS232		✓	✓	✓	✓	OK
F3-AB128-T	+	port 1 RS422	✓	✓	✓	✓		2kv goes out of run -recovers
F3-AB128-T	-	port 1 RS422	✓	✓	x	x		1kv program corrupted
F3-AB128-T	+	port 2 RS232		✓	✓	✓		2kv goes out of run - recovers
F3-AB128-T	-	port 2 RS232		✓	✓	✓		:
F3-AB128-T	+	phone line			✓	✓		:
F3-AB128-T	-	phone line		✓	✓	✓		:
F3-AB128-R	+	port 1	✓	✓	✓	✓		:

Device	pol	Port	ESD	Burst Transients (KV)				Function check and comments
			8kv Air	0.5	1	2	4	
F3-AB128-R	-	RS232 port 1	✓	✓	✓	✓		:
F3-AB128-R	+	RS232 port 1		✓	✓	✓		:
F3-AB128-R	-	RS422 port 1		✓	✓	✓		:
D3-08ND2(E-01N)	+	RS422 DC input		✓	✓	✓		CPU immunity program. ON/OFF levels checked.
D3-08ND2(E-01N)	-	DC input		✓	✓	✓		:
D3-16ND2-1(E-05N)	+	DC input		✓	✓	✓		:
D3-16ND2-1(E-05N)	-	DC input		✓	✓	✓		:
D3-16ND2-2(E-35N)	+	DC input		✓	✓	✓		:
D3-16ND2-2(E-35N)	-	DC input		✓	✓	✓		:
D3-16ND2F(E-05NH)	+	DC input		✓	✓	✓		:
D3-16ND2F(E-05NH)	-	DC input		✓	✓	✓		:
D3-16ND3F	+	DC input		✓	✓			:
D3-16ND3F	-	DC input		✓	✓	✓		:
D3-08NA-1(E-20N)	+	AC input		✓	✓	✓		:
D3-08NA-1(E-20N)	-	AC input		✓	✓	✓		:
D3-08NA-2(E-22N)	+	AC input		✓	✓	✓		:
D3-08NA-2(E-22N)	-	AC input		✓	✓	✓		:
D3-16NA(E-25N)	+	AC input		✓	✓	✓		:
D3-16NA(E-25N)	-	AC input		✓	✓	✓		:
D3-08NE3(E-02N)	+	AC/DC input		✓	✓	✓		:
D3-08NE3(E-02N)	-	AC/DC input		✓	✓	✓		:
D3-16NE3(E-55N)	+	AC/DC input		✓	✓	✓		:
D3-16NE3(E-55N)	-	AC/DC input		✓	✓	✓		:
D3-04TD1(E-12T)	+	DC output		✓	✓	✓		:
D3-04TD1(E-12T)	-	DC output		✓	✓	✓		:
D3-08TD1(E-10T)	+	DC output		✓	✓	✓		:
D3-08TD1(E-10T)	-	DC output		✓	✓	✓		:
D3-08TD2(E-50T)	+	DC output		✓	✓	✓		:
D3-08TD2(E-50T)	-	DC output		✓	✓	✓		:
D3-16TD1-1(E-15T)	+	DC output		✓	✓	✓		2kv goes out of run - recovers
D3-16TD1-1(E-15T)	-	DC output		✓	✓	✓		immunity prog + accuracy test
D3-16TD1-2(E-35T)	+	DC output		✓	✓	✓		2kv goes out of run

Device	pol	Port	ESD	Burst Transients (KV)				Function check and comments
			8kv Air	0.5	1	2	4	
D3-16TD1-2(E-35T)	-	output DC		✓	✓	✓		- recovers :
D3-16TD2 (E-55T)	+	output DC		✓	✓	✓		:
D3-16TD2 (E-55T)	-	output DC		✓	✓	✓		:
D3-04TAS(E-21T)	+	output AC		✓	✓	✓		:
D3-04TAS(E-21T)	-	output AC		✓	✓	✓		:
F3-08TAS	+	output AC						:
F3-08TAS	-	output AC		✓				:
D3-08TA-1(E-20T-1)	+	output AC		✓	✓	✓		:
D3-08TA-1(E-20T-1)	-	output AC		✓	✓	✓		:
D3-08TA-2(E-20T)	+	output AC		✓	✓	✓		:
D3-08TA-2(E-20T)	-	output AC		✓	✓	✓		:
F3-16TA-1	+	output AC		✓	✓	✓		:
F3-16TA-1	-	output AC		✓	✓	✓		:
D3-16TA-2(E-25T)	+	output AC		✓	✓	✓		:
D3-16TA-2(E-25T)	-	output AC		✓	✓	✓		:
D3-08TR(E-01T)	+	output Relay		✓	✓	✓		:
D3-08TR(E-01T)	-	output Relay		✓	✓	✓		:
F3-08TRS-1	+	output Relay		✓	✓	✓		:
F3-08TRS-1	-	output Relay		✓	✓	✓		:
F3-08TRS-2	+	output Relay		✓	✓	✓		:
F3-08TRS-2	-	output Relay		✓	✓	✓		:
D3-16TR(E-05T)	+	output Relay		✓	✓	✓		:
D3-16TR(E-05T)	-	output Relay		✓	✓	✓		:
F3-04ADS	+	output analogue input		✓	✓	✓		CPU immunity program. accuracy checked. :
F3-04ADS	-	output analogue input		✓	✓	✓		:
D3-04AD(E-01AD)	+	output analogue input	✓	✓	✓	✓		2kv goes out of run - recovers :
D3-04AD(E-01AD)	-	output analogue input	✓	✓	✓	✓		:
D3-04AD(E-01AD)	+	output DC in		✓	✓	✓		:
D3-04AD(E-01AD)	-	output DC in		✓	✓	✓		:
F3-08AD	+	output analogue input	✓	✓	✓	✓		:
F3-08AD	-	output analogue input	✓	✓	✓	✓		:
F3-16AD	+	output analogue input	✓	✓	✓	✓		immunity prog + accuracy test :
F3-16AD	-	output analogue input	✓	✓	✓	✓		:

Device	pol	Port	ESD	Burst Transients (KV)				Function check and comments
			8kv Air	0.5	1	2	4	
F3-08TEMP	+	input	✓	✓	✓	✓		2kv goes out of run
F3-08TEMP	-	input	✓	✓	✓	✓		- recovers
F3-08THM-K	+	input	✓	✓	✓	✓		:
F3-08THM-K	-	input	✓	✓	✓	✓		:
D3-02DA(E-01DA)	+	output	✓	✓	✓	✓		2kv goes out of run
D3-02DA(E-01DA)	-	output	✓	✓	✓	✓		- recovers
D3-02DA(E-01DA)	+	DC in		✓	✓	✓		:
D3-02DA(E-01DA)	-	DC in		✓	✓	✓		:
F3-04DA-1	+	output	✓	✓	✓	✓		immunity prog + accuracy test
F3-04DA-1	-	output	✓	✓	✓	✓		2kv goes out of run
F3-04DAS	+	output	✓	✓	✓	✓		-recovers
F3-04DAS	-	output	✓	✓	✓	✓		:
D3-232-DCU(E-03DM)	+	RS232	✓	✓	✓	✓		1kv and 2kv goes out of run
D3-232-DCU(E-03DM)	-	RS232	✓	✓	✓	✓		- recovers
D3-232-DCU(E-03DM)	+	DC in		✓	✓	✓		:
D3-232-DCU(E-03DM)	-	DC in		✓	✓	✓		2kv goes out of run
D3-422-DCU(E-02DM)	+	RS422	✓	✓	✓	✓		-recovers
D3-422-DCU(E-02DM)	-	RS422	✓	✓	✓	✓		:
D3-422-DCU(E-02DM)	+	DC in		✓	✓	✓		immunity prog + accuracy test
D3-422-DCU(E-02DM)	-	DC in		✓	✓	✓		:
D3-08SIM(E-01S)	+	none						:
D3-08SIM(E-01S)	-	none						:
D3-HSC(E-01Z)	+	input	✓	✓	✓	✓		:
D3-HSC(E-01Z)	-	input	✓	✓	✓	✓		:
D3-HSC(E-01Z)	+	output		✓	✓	✓		:
D3-HSC(E-01Z)	-	output		✓	✓	✓		:
D3-HSC(E-01Z)	+	DC in		✓	✓	✓		:

Device	pol	Port	ESD 8kv Air	Burst Transients (KV)				Function check and comments
				0.5	1	2	4	
D3-HSC(E-01Z)	-	DC in		✓	✓	✓		:
D3-PWU(C-22P)	+	DC in						:
D3-PWU(C-22P)	-	DC in		✓	✓	✓		:
D3-TCSU(F-10D) with D3-HP(R-23P) and D3-HPCBL(E-15PJ-1)	+	cable	✓	✓	✓	✓		:
D3-TCSU(F-10D) with D3-HP(R-23P) and D3-HPCBL(E-15PJ-1)	-	cable	✓	✓	✓	✓		:

Notes

Burst transient tests that failed at 2kv by causing the CPU to switch out of run mode, then recovered automatically when the test was completed have been passed to criteria B.

Note that criteria B system design must allow for temporary cessation of communications and the switch from run mode during interference, and these systems must operate reliably and automatically recover.

Declaration Of conformity

This is to certify that the DL305 (SA/SR-20) PROGRAMMABLE LOGIC CONTROL SYSTEM, comprising:

Base/PSU 115/230vAC	D3-05B(E-02B), D3-08B(E-05B), D3-10B(E-04B) with D3-EXCBL(E-05J)
Base/PSU 24vDC	D3-05BDC(E-02B-C), D3-10BDC(E-04B-C)
CPU's	D3-330(SR-22), D3-330P(SA-22), D3-340 with D3-D4-BATT(RB-5)
Special CPU's	F3-RTU-1, F3-OMUX-1, F3-OMUX-2, F3-OMUX-3, F3-PMUX
CoProcessors	F3-AB128, F3-AB128-T, F3-AB128-R
DC input modules	D3-08ND2(E-01N), D3-16ND2-1(E-05N), D3-16ND2-2(E-35N), D3-16ND2F(E-05NH), D3-16ND3F
AC input modules	D3-08NA-1(E-20N), D3-08NA-2(E-22N), D3-16NA(E-25N)
AC/DC input modules	D3-08NE3(E-02N), D3-16NE3(E-55N)
DC transistor output modules	D3-04TD1(E-12T), D3-08TD1(E-10T), D3-08TD2(E-50T), D3-16TD1-1(E-15T), D3-16TD1-2(E-35T), D3-16TD2(E-55T)
AC output modules	D3-04TAS(E-21T), F3-08TAS, D3-08TA-1(E-20T-1), D3-08TA-2(E-20T) F3-16TA-1, D3-16TA-2(E-25T)
Relay output modules	D3-08TR(E-01T), F3-08TRS-1, F3-08TRS-2, D3-16TR(E-05T)
Analogue input modules	F3-04ADS, D3-04AD(E-01AD), F3-08AD, F3-16AD, F3-08TEMP F3-08THM-n [note: n=J,K,T,R,S,E,1,2 versions]
Analogue output modules	D3-02DA(E-01DA), F3-04DA-1, F3-04DAS
Communications modules	D3-232-DCU(E-03DM), D3-422-DCU(E-02DM)
Special modules	D3-08SIM(E-01S), D3-HSC(E-01Z), D3-PWU(C-22P), D3-TCSU(F-10D)
Programming devices	D3-HP(R-23P), D3-HPP(A-23P) with cable D3-HPCBL(E-15PJ-1) and PC programming cables D3-DSCBL-1*, D3-DSCBL-2*
Communications adapter	FA-UNICON

Manufactured by:

First code 'D'	Koyo Electronics Industries Co., Ltd. 1-171, Tenjin-cho, Kodaira-shi, Tokyo 187, Japan.
First code 'F'	FACTS Engineering Inc. , 34760 U.S. Highway 19, Palm Harbor, Florida, 34684. USA.
*D3-DSCBL-1/2	PLC-Direct by Koyo , 3505 Hutchinson Road, Cumming, GA 30130. USA.

Conforms with the requirements of Council Directive 89/336/EEC, relating to **Electromagnetic Compatibility**, by the application of the following standards:

EN50081-1:1992	Generic Domestic and Light Industrial Environment (Emission)
EN50081-2:1994	Generic Heavy Industrial Environment (Emission)
EN50082-1:1992	Generic Domestic and Light Industrial Environment (Immunity)
EN50082-2:1995	Generic Heavy Industrial Environment (Immunity)

Conforms with the requirements of Council Directive 73/23/EEC, known as the **Low Voltage Directive**, by the application of the following standards, for Installation Category 1, Pollution level 1.

EN61010-1-1:1993	Safety requirements for electrical equipment for measurement control and laboratory use.
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When properly installed to the PLC installation manual D3-USER-M, with note of the special requirements detailed in DA-EM-M based on the European EMC, Low Voltage and Machinery directives, plus the recommendations included in the installation standards IEC 1000-5-1, IEC 1000-5-2, and IEC 1131-4.

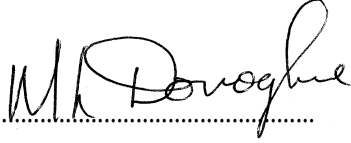
DL305 AC powered systems do not comply with the voltage requirements of section 4.3.1. of the Machinery Directive standard EN 60204-1, and should only be used for non-machinery applications. All DL205(SZ), DL405(SU) and DC powered DL305(SA/SR-20) systems can be used for the control of machinery.

It is a requirement that mains filter type Schaffner FN2080-1/06, or equivalent, is fitted in the AC power lead of each DL305(SA/SR-20) PLC system, and that all PLC equipment must be housed in a protective steel enclosure, sealed against the ingress of moisture and polluting gases, and which limits access by operators for safety reasons by lock and power breaker. If access is required by operators and untrained personnel by removal of covers or opening doors, for the adjustment of controls, replacement of consumable materials, or to remove or change parts and options, then the PLC equipment must be installed inside an internal cover or secondary enclosure.

It should be noted that safety requirements of the Machinery directive standard EN60204-1 state that all control circuits and PLC power must be via

isolation transformers or an isolating power supply, and one side of all AC or DC control circuits must be earthed, which is the same as Installation Category 1 of standard EN61010-1.

Both power input connections to a PLC must be separately fused using 3 amp T type anti-surge fuses, and a transient suppresser fitted to limit PLC supply and control circuit over voltages to 1500v maximum.

Signed	
Date	January 1 st , 1997.
Name	ML Donoghue (being the responsible person appointed by the manufacturer)
Position	Product Evaluation Manager, UK Testing Facility
Location	PLC-Direct UK Division, 22 High Street, Caterham, CR3 5UA. England.

Test Summary for DL 405

RF radiated emissions EN50081-1 (EN55022 class B), EN50081-2 (EN55011 group 1, class A)

Test A

RF emissions from fully power loaded systems using basic digital I/O without intelligent, communications, or analogue modules. Highest emissions recorded are listed below.

Product	UK test site @ 3m aerial distance				Limits EN 50081	
	Freq. Mhz	Ant. v/h	Peak dBuV	Ave dBuV	-1 dBuV	-2 dBuV
D4-430(SU-5E) driving relay modules, single 8 slot base	92	v	28	-	40pk.	50qp
D4-440(SU-6B) driving relay modules, single 8 slot base	86	h	26	-	:	:
D4-RS(U-02RS) with relay modules, linked to 430(SU-5E) base	111	v	35	-	:	:
D4-440DC-1(SU-6B-C) relay modules, single 8 slot base	76	h	27	-	:	:
D4-440DC-2(SU-6B-Y) relay modules, single 8 slot base	86	h	28	-	:	:
Product	83	h	32	-	:	:
D4-EX(U-01EW) with relay modules, linked to 430(SU-5E) base	125	v	34	-	:	:
D4-EXDC(U-01EW-C) with relay modules, to 430(SU-5E) base	126	v	34	-	:	:
D4-EXDC-2 (U-01EW-Y) relay modules, to 430(SU-5E) base	113	h	30	-	:	:

Test B

RF radiated emissions from fully loaded AC powered systems using speciality, communications, and analogue I/O modules that contain micro processors, but without external cable connections.

Product	UK test site @ 3m aerial distance			Limits EN 50081	
	Freq. Mhz	Ant. v/h	Peak dBuV	-1 dBuV	-2 dBuV
D4-430(SU-5E) system plus D4-EX(U-01EW) on two full 8 slot bases with DCM(U-01DM),CP128, SLV-MBR,SM(U-03RM), + analog I/O modules.	117	v	30	40 pk.	50 q.p.
D4-440(SU-6B) system + D4-EX(U-01EW) on two 8 slot bases with HSC(U-01Z), PID, SDN, 8MPI, 4LTC(U-4LTC), SDS, 08THM(U-8THM),HPP(S-01P), and all analog I/O.	120	v	34	:	:

Test C

Secondary RF radiated emissions from Cabling and Operator Interfaces.

Product	UK test site @ 3m aerial distance					Limits EN 50081	
	Freq. Mhz	Ant. v/h	Peak dBuV	Ave dBuV	quasi peak	-1 dBuV	-2 dBuV
Remote I/O cables							
- minimum length (200mm)	86	h	11	-	-	40 pk.	50 q.p.
- 2 metre length	86	h	30	-	-	:	:
Mains cabling							
- restricted to within cabinet	90	h	10	-	-	:	:
- 2 metres in open air	90	h	20	-	-	:	:
- 2 m in steel trunking	90	h	9	-	-	:	:
- in trunking with bond wire	90	h	5	-	-	:	:
- 2m in flex steel conduit	90	h	2	-	-	:	:
Cabling to DC o/p							
- open twisted pair	90	h	7	3	-	:	:
- as above + ferrite beads	90	h	6	2	-	:	:
- in steel trunking	90	h	5	1	-	:	:
- background with PLC off	90	h	3	1	-	:	:
- with adjacent earth wire	90	h	12	6	-	:	:
Hand programmer							
- with standard cable	83	h	26	-	-	:	:
- as above, with ferrite beads	83	h	5	-	-	:	:
DV1000							
- with standard cable	88	h	20	14	-	:	:
- as above, with ferrite beads	88	h	10	4	-	:	:
OP-1500							
- with standard cable	129	h	12	7	-	:	:
- as above, with ferrite beads	129	h	7	2	-	:	:
DCM to FA-UNICON							
CPU - unscreened cable	88	h	14	11	-	:	:
Belden 9855 screened cable	113	h	16	10	-	:	:
Belden cable- as above with ferrite beads	113	h	15	8	-	:	:
Analogue modules							
- twisted pair cabling	86	h	11	7	-	:	:

Comments

No special measures required with basic, speciality, or analogue PLC equipment. Average and QP readings were not recorded as peak levels below limits. No problems with emissions from various arrangements of AC power cabling, or from the cabling to the auxiliary DC output supply.

When using the recommended Belden cable to interconnect D4-RS(U-02RS) units emissions were detected at 86Mhz of 11dB with the shortest possible

cable between two adjacent units. These emissions increased to 30dB with only a short 2 metre cable length, putting the emissions only 10dB below the limits. Also when using Belden cabling in a network emissions are high. Therefore, all recommended Belden cabling, and therefore all network cabling, must be run through steel trunking in a factory, with earth bond wires between control cabinets, and cable screens bonded to control cabinet framework at both ends of cable.

Of particular importance is that when submitting machinery to a test house for approval network and serial communications cabling must be double screened, with the screen earthed to machine frame and ground plane at the remote end, and the cables must be run in flexible steel trunking to outside the test area.

RF conducted emissions from AC power leads

EN50081-1 (EN55022 Class B)

EN50081-2 (EN55011 group 1, Class A)

Highest emissions recorded listed below, with all systems fully power loaded.

Product	Spectrum Analyser + LISN					Limit EN 50081	
	Freq. kHz	Peak	Ave	PRF	Q.Peak	-1 Domestic	-2 Ind
D4-430(SU-5E)	180	65	-	-	-	66qp, 56 ave.	79qp, 66 ave.
D4-440(SU-6B)	180	66	52	-	-	:	:
D4-EX(U-01EW)	180	53	-	-	-	:	:
D4-RS(U-02RS)	200	62	-	-	-	:	:

Emissions are either at, or below limits so no extra mains filtering required. If operation is required in the domestic (local distributed power) environment then you may choose to fit a mains filter.

RF radiated immunity

EN50082-1 (IEC 801-3 criteria A)

EN50082-2 (ENV50140, ENV50204)

Passed in test house TUV Rheinland.

RF conducted immunity

EN50082-2 (EN50141 criteria A)

Passed both domestic and industrial limits for signal, control, and power lines by the BCI test method when PLC mounted as a system onto a steel base plate, with cabling run parallel to, and no greater than 100mm above the base plate, in order to simulate cabling mounted in plastic trunking within a control cubicle.

Effect of RF field

Using Bulk Current Injection method, on analogue modules utilising twisted pair unscreened cabling.

Apparatus utilising the following analogue modules must accept the FS errors highlighted below, and operate within their specification to criteria A (no effect).

Device	Mode I	V	Input Earth	RF	Nom value	Range min	max	FS Error	Test arrangement
F4-04AD(U01AD-1)	✓	x	x	x	127	119	158	0.76%	Current, floating, no RF.
F4-04AD(U01AD-1)	✓	x	x	x	2048	2026	2057	0.54%	Current, floating, no RF.
F4-04AD(U01AD-1)	✓	x	x	x	3967	3947	3977	0.49%	:
F4-04AD(U01AD-1)	✓	x	x	✓	127	112	193	1.61%	Current, floating, RF on.
F4-04AD(U01AD-1)	✓	x	x	✓	2048	2026	2112	1.56%	:
F4-04AD(U01AD-1)	✓	x	x	✓	3967	3931	4000	0.88%	:
F4-04AD(U01AD-1)	✓	x	0V/C	x	126	125	126	0.02%	Current, DC 0v linked to common, no RF.
F4-04AD(U01AD-1)	✓	x	0V/C	x	2047	2047	2048	0.02%	:
F4-04AD(U01AD-1)	✓	x	0V/C	x	3967	3966	3967	0.02%	Current, DC 0v linked to common, RF on.
F4-04AD(U01AD-1)	✓	x	0V/C	✓	126	126	131	0.12%	:
F4-04AD(U01AD-1)	✓	x	0V/C	✓	2047	2046	2048	0.05%	:
F4-04AD(U01AD-1)	✓	x	0V/C	✓	3967	3962	3967	0.12%	:
F4-04AD(U01AD-1)	✓	x	✓	x	127	127	127	0.00%	Current, earthed input and 0V, no RF.
F4-04AD(U01AD-1)	✓	x	✓	x	2047	2047	2048	0.02%	:
F4-04AD(U01AD-1)	✓	x	✓	x	3967	3966	3967	0.02%	Current, earthed input and 0v, RF on.
F4-04AD(U01AD-1)	✓	x	✓	✓	127	126	135	0.20%	:
F4-04AD(U01AD-1)	✓	x	✓	✓	2047	2047	2050	0.05%	Voltage, earthed, no RF.
F4-04AD(U01AD-1)	✓	x	✓	✓	3967	3964	3967	0.07%	Voltage, earthed, RF on.
F4-04AD(U01AD-1)	x	✓	✓	x	2047	2047	2048	0.02%	Voltage, floating, RF on.
F4-04AD(U01AD-1)	x	✓	✓	✓	2047	2041	2047	0.15%	Voltage, floating, no RF.
F4-04AD(U01AD-1)	x	✓	x	✓	2047	2082	2121	1.81%	Current, earthed, no RF.
F4-04AD(U01AD-1)	x	✓	x	x	2047	2092	2110	1.54%	Current, earthed, RF on.
F4-04ADS	✓	x	✓	x	2047	2044	2050	0.07%	Current, floating, no RF.
F4-04ADS	✓	x	✓	✓	2047	2022	2083	0.88%	Current, earthed, RF on.
F4-04ADS	✓	x	x	x	2048	2044	2054	0.15%	Current, floating, no RF.
F4-04ADS	✓	x	x	✓	2048	2012	2113	1.59%	Current, floating, RF on.
F4-04ADS	x	✓	✓	x	2047	2046	2047	0.02%	Voltage, earthed, no RF.
F4-04ADS	x	✓	✓	✓	2047	2037	2073	0.63%	Voltage, earthed, RF on.
F4-04ADS	x	✓	x	x	2047	2040	2051	0.17%	Voltage, floating, no RF.
F4-04ADS	x	✓	x	✓	2047	2028	2096	1.20%	Voltage,

Device	Mode I	V	Input Earth	RF	Nom value	Range min	max	FS Error	Test arrangement
F4-08AD(U-8ADC-1)	✓	x	x	x	2048	2048	2049	0.02%	floating, RF on. Current, floating, no RF.
F4-08AD(U-8ADC-1)	✓	x	x	✓	2048	2024	2050	0.59%	Current, floating, RF on.
F4-08AD(U-8ADC-1)	✓	x	✓	x	2048	2048	2049	0.02%	Current, earthed, no RF.
F4-08AD(U-8ADC-1)	✓	x	✓	✓	2048	1897	2070	3.69%	Current, earthed, RF on.
F4-08AD(U-8ADC-1)	✓	x	✓	✓	2049	2008	2079	1.03%	- using shielded cable.
F4-08AD(U-8ADC-1)	x	✓	✓	x	2049	2049	2050	0.02%	Voltage, earthed, no RF.
F4-08AD(U-8ADC-1)	x	✓	✓	✓	2049	2039	2085	0.88%	Voltage, earthed, RF on.
F4-08AD(U-8ADC-1)	x	✓	x	x	2050	2049	2050	0.02%	Voltage, floating, no RF.
F4-08AD(U-8ADC-1)	x	✓	x	✓	2050	2034	2050	0.39%	Voltage, floating, RF on.
F4-08THM(U-8THM)	x	x	x	x	713	713	715	0.05%	- slowly increasing temp.
F4-08THM(U-8THM)	x	x	x	✓	715	715	715	0.00%	Earthed, RF on.
F4-08THM(U-8THM)	x	x	✓	x	714	714	716	0.05%	- slowly increasing temp.
F4-08THM(U-8THM)	x	x	✓	✓	715	715	715	0.00%	Earthed, RF on.
F4-4LTC(U-4LTC)	x	x	x	x	168	162	171	0.15%	Floating, no RF.
F4-4LTC(U-4LTC)	x	x	x	✓	168	154	215	1.15%	Floating, RF on.
F4-4LTC(U-4LTC)	x	x	✓	x	168	164	169	0.10%	Earthed, no RF.
F4-4LTC(U-4LTC)	x	x	✓	✓	168	161	189	0.51%	Earthed, RF on.

50Hz magnetic field immunity EN50082-2 (EN61000-4-8 criteria A)
Not applicable as there are no susceptible components.

Voltage dips and interruptions EN50082-2, [EN61000-4-11 criteria B (10mS), C (100mS)]
All systems tested when fully loaded and operational. All systems withstand 100% power loss for 1 second to criteria A, which fully covers the 30%/10mS, 60%/100mS requirements. DC powered systems withstand 100% interruption at 100mS with no effect on operation (criteria A). Well within requirements. Voltage interruption for 5 seconds in both AC and DC powered systems causes controlled power down and power up to criteria B.

ESD immunity of enclosure port EN50082-1 [IEC 801-3 (8kv air, criteria B)]
EN50082-2 [EN61000-4-2 (4kv contact, 8kv air, criteria B)]

Fast transient/
burst immunity

EN50082-1 (IEC 801-4), (0.5kv signal, control and DC lines, 1kv AC lines, criteria B)

EN50082-2 (EN61000-4-4), (1kv signal, 2kv measurement, control, DC, AC lines, criteria B)

Device	pol	Port	ESD 8kv air	Burst Transients (KV)				Function check and Comments
				0.5	1	2	4	
D4-430(SU-5E)	+	live	✓	✓	✓	✓	✓	CPU main immunity program
D4-430(SU-5E)	-	live	✓	✓	✓	✓	✓	:
D4-430(SU-5E)	+	neutral		✓	✓	✓	✓	:
D4-430(SU-5E)	-	neutral		✓	✓	✓	✓	:
D4-430(SU-5E)	+	earth		✓	✓	✓	✓	:
D4-430(SU-5E)	-	earth		✓	✓	✓	✓	:
D4-430(SU-5E)	+	DC out		✓	✓	✓	✓	CPU and power output check
D4-430(SU-5E)	-	DC out		✓	✓	✓	✓	:
D4-430(SU-5E)	+	top RS232		✓	✓	✓	✓	CPU main immunity program
D4-430(SU-5E)	-	top RS232		✓	✓	✓	✓	:
D4-430(SU-5E)	+	bottom RS422		✓	✓	✓	✓	:
D4-430(SU-5E)	-	bottom RS422		✓	✓	✓	✓	:
D4-440(SU-6B)	+	live	✓	✓	✓	✓	✓	:
D4-440(SU-6B)	-	live	✓	✓	✓	✓	✓	:
D4-440(SU-6B)	+	neutral		✓	✓	✓	✓	:
D4-440(SU-6B)	-	neutral		✓	✓	✓	✓	:
D4-440(SU-6B)	+	earth		✓	✓	✓	✓	:
D4-440(SU-6B)	-	earth		✓	✓	✓	✓	:
D4-440(SU-6B)	+	DC out		✓	✓	✓	✓	CPU and power output check
D4-440(SU-6B)	-	DC out		✓	✓	✓	✓	:
D4-440(SU-6B)	+	top RS232		✓	✓	✓	✓	CPU main immunity program
D4-440(SU-6B)	-	top RS232		✓	✓	✓	✓	:
D4-440(SU-6B)	+	bottom RS422		✓	✓	✓	✓	:
D4-440(SU-6B)	-	bottom RS422		✓	✓	✓	✓	:
D4-440DC-2(SU-6B-Y)	+	DC in	✓	✓	✓	✓	✓	:
D4-440DC-2(SU-6B-Y)	-	DC in	✓	✓	✓	✓	✓	:
D4-440DC-2(SU-6B-Y)	+	top RS232		✓	✓	✓	✓	:
D4-440DC-2(SU-6B-Y)	-	top RS232		✓	✓	✓	✓	:
D4-440DC-2(SU-6B-Y)	+	bottom RS232		✓	✓	✓	✓	:
D4-440DC-2(SU-6B-Y)	-	bottom RS232		✓	✓	✓	✓	:
D4-EX(U-01EW)	+	live	✓	✓	✓	✓	✓	:
D4-EX(U-01EW)	-	live	✓	✓	✓	✓	✓	:
D4-EX(U-01EW)	+	neutral		✓	✓	✓	✓	:
D4-EX(U-01EW)	-	neutral		✓	✓	✓	✓	:
D4-EX(U-01EW)	+	earth		✓	✓	✓	✓	:
D4-EX(U-01EW)	-	earth		✓	✓	✓	✓	:
D4-EX(U-01EW)	+	DC out		✓	✓	✓	✓	:
D4-EX(U-01EW)	-	DC out		✓	✓	✓	✓	:
D4-EXDC-2(U-01EW-Y)	+	DC in	✓	✓	✓	✓	✓	:
D4-EXDC-2(U-01EW-Y)	-	DC in	✓	✓	✓	✓	✓	:

Device	pol	Port	ESD 8kv air	Burst Transients (KV)				Function check and Comments
				0.5	1	2	4	
D4-RS(U-02RS) with D4-RM(U-02RM)	+	mains live	✓	✓	✓	✓	✓	:
D4-RS(U-02RS) with D4-RM(U-02RM)	-	live	✓	✓	✓	✓	✓	:
D4-RS(U-02RS) with D4-RM(U-02RM)	+	neutral		✓	✓	✓	✓	:
D4-RS(U-02RS) with D4-RM(U-02RM)	-	neutral		✓	✓	✓	✓	:
D4-RS(U-02RS) with D4-RM(U-02RM)	+	earth		✓	✓	✓	✓	:
D4-RS(U-02RS) with D4-RM(U-02RM)	-	earth		✓	✓	✓	✓	:
D4-RS(U-02RS) with D4-RM(U-02RM)	+	RS485		✓	✓	✓	✓	:
D4-RS(U-02RS) with D4-RM(U-02RM)	-	RS485		✓	✓	✓	✓	:
D4-RS(U-02RS) with D4-RM(U-02RM)	+	DC out		✓	✓	✓	✓	:
D4-RS(U-02RS) with D4-RM(U-02RM)	-	DC out		✓	✓	✓	✓	:
D4-RSDC(U-02RS-C) + D4-RM(U-02RM)	+	DC in	✓	✓	✓	✓	✓	:
D4-RSDC(U-02RS-C) + D4-RM(U-02RM)	-	DC in	✓	✓	✓	✓	✓	CPU main immunity program
D4-SS-88(U-03RS-NT1) + D4-SM(U-03RM)	+	RS485	✓	✓	✓	✓	✓	:
D4-SS-88(U-03RS-NT1) + D4-SM(U-03RM)	-	RS485	✓	✓	✓	✓	✓	:
D4-SS-88(U-03RS-NT1) + D4-SM(U-03RM)	+	input		✓	✓	✓	✓	:
D4-SS-88(U-03RS-NT1) + D4-SM(U-03RM)	-	input		✓	✓	✓	✓	:
D4-SS-88(U-03RS-NT1) + D4-SM(U-03RM)	+	output		✓	✓	✓	✓	:
D4-SS-88(U-03RS-NT1) + D4-SM(U-03RM)	-	output		✓	✓	✓	✓	:
D4-SS-88(U-03RS-NT1) + D4-SM(U-03RM)	+	DC in		✓	✓	✓	✓	:
D4-SS-88(U-03RS-NT1) + D4-SM(U-03RM)	-	DC in		✓	✓	✓	✓	:
D4-SS-88(U-03RS-NT1) + D4-SM(U-03RM)	+	RS232		✓	✓	✓	✓	:
D4-SS-88(U-03RS-NT1) + D4-SM(U-03RM)	-	RS232		✓	✓	✓	✓	:
D4-SS-106(U-03RS-NT2) + D4-SM(U-03RM)	+	RS485	✓	✓	✓	✓	✓	:
D4-SS-106(U-03RS-NT2) + D4-SM(U-03RM)	-	RS485	✓	✓	✓	✓	✓	:
D4-SS-106(U-03RS-NT2) + D4-SM(U-03RM)	+	input		✓	✓	✓	✓	:
D4-SS-106(U-03RS-NT2) + D4-SM(U-03RM)	-	input		✓	✓	✓	✓	:
D4-SS-106(U-03RS-NT2) + D4-SM(U-03RM)	+	output		✓	✓	✓	✓	:
D4-SS-106(U-03RS-NT2) + D4-SM(U-03RM)	-	output		✓	✓	✓	✓	:
D4-SS-106(U-03RS-NT2) + D4-SM(U-03RM)	+	DC in		✓	✓	✓	✓	:
D4-SS-106(U-03RS-NT2) + D4-SM(U-03RM)	-	DC in		✓	✓	✓	✓	:
D4-SS-106(U-03RS-NT2) + D4-SM(U-03RM)	+	RS232		✓	✓	✓	✓	:
D4-SS-106(U-03RS-NT2) + D4-SM(U-03RM)	-	RS232		✓	✓	✓	✓	:

Device	pol	Port	ESD 8kv air	Burst Transients (KV)				Function check and Comments
				0.5	1	2	4	
D4-SM(U-03RM)								
D4-SS-16T(U-03RS-T1) + D4-SM(U-03RM)	+	RS485	✓	✓	✓	✓	✓	:
D4-SS-16T(U-03RS-T1) + D4-SM(U-03RM)	-	RS485	✓	✓	✓	✓	✓	:
D4-SS-16T(U-03RS-T1) + D4-SM(U-03RM)	+	input		✓	✓	✓	✓	:
D4-SS-16T(U-03RS-T1) + D4-SM(U-03RM)	-	input		✓	✓	✓	✓	:
D4-SS-16T(U-03RS-T1) + D4-SM(U-03RM)	+	output		✓	✓	✓	✓	:
D4-SS-16T(U-03RS-T1) + D4-SM(U-03RM)	-	output		✓	✓	✓	✓	:
D4-SS-16T(U-03RS-T1) + D4-SM(U-03RM)	+	DC in		✓	✓	✓	✓	:
D4-SS-16T(U-03RS-T1) + D4-SM(U-03RM)	-	DC in		✓	✓	✓	✓	:
D4-SS-16T(U-03RS-T1) + D4-SM(U-03RM)	+	RS232		✓	✓	✓	✓	:
D4-SS-16T(U-03RS-T1) + D4-SM(U-03RM)	-	RS232		✓	✓	✓	✓	:
D4-SS-16N(U-03RS-N1) + D4-SM(U-03RM)	+	RS485	✓	✓	✓	✓	✓	:
D4-SS-16N(U-03RS-N1) + D4-SM(U-03RM)	+	RS485	✓	✓	✓	✓	✓	:
D4-SS-16N(U-03RS-N1) + D4-SM(U-03RM)	+	input		✓	✓	✓	✓	:
D4-SS-16N(U-03RS-N1) + D4-SM(U-03RM)	+	input		✓	✓	✓	✓	:
D4-SS-16N(U-03RS-N1) + D4-SM(U-03RM)	+	output		✓	✓	✓	✓	:
D4-SS-16N(U-03RS-N1) + D4-SM(U-03RM)	+	output		✓	✓	✓	✓	:
D4-SS-16N(U-03RS-N1) + D4-SM(U-03RM)	+	DC in		✓	✓	✓	✓	:
D4-SS-16N(U-03RS-N1) + D4-SM(U-03RM)	+	DC in		✓	✓	✓	✓	:
D4-SS-16N(U-03RS-N1) + D4-SM(U-03RM)	+	RS232		✓	✓	✓	✓	:
D4-SS-16N(U-03RS-N1) + D4-SM(U-03RM)	+	RS232		✓	✓	✓	✓	:
F4-CP128-1	+	port 1 RS232	✓	✓	✓	✓	✓	CPU immunity + Print programs
F4-CP128-1	-	port 1 RS232	✓	✓	✓	✓	✓	:
F4-CP128-1	+	port 2 RS422		✓	✓	✓	✓	:
F4-CP128-1	-	port 2 RS422		✓	4	✓	✓	:
F4-CP512	+	port 1 RS232	✓	✓	✓	✓	✓	:
F4-CP512	-	port 1 RS232	✓	✓	✓	✓	✓	:
F4-CP512	+	port 2 RS422		✓	✓	✓	✓	:
F4-CP512	-	port 2 RS422		✓	✓	✓	✓	:
F4-CP128-T	+	port 1 RS232	fail	fail				500v stops program, and requires reset. Passes 500v and 1000v if Belden cable with earthed screen + ferrite beads utilised. 2000v corrupts memory

Device	pol	Port	ESD 8kv air	Burst Transients (KV)				Function check and Comments
				0.5	1	2	4	
F4-CP128-T	-	port 1 RS232	fail	fail				CPU immunity + Print programs
F4-CP128-T	+	port 2 RS422		fail				:
F4-CP128-T	-	port 2 RS422		fail				:
F4-CP128-T	+	port 3		fail				:
F4-CP128-T	-	port 3		fail				:
F4-CP128-R	+	port 1 RS422	fail	fail				:
F4-CP128-R	-	port 1 RS422	fail	fail				:
F4-CP128-R	+	port 2 RS232		fail				:
F4-CP128-R	-	port 2 RS232		fail				:
D4-08ND3S(U-50N)	+	DC input	✓	✓	✓	✓		CPU main immunity program Checked ON/OFF levels
D4-08ND3S(U-50N)	-	DC input	✓	✓	✓	✓		:
D4-16ND2(U-05N)	+	DC input	✓	✓	✓	✓		:
D4-16ND2(U-05N)	-	DC input	✓	✓	✓	✓		:
D4-16ND2F(U-05NH)	+	DC input	✓	✓	✓	✓		:
D4-16ND2F(U-05NH)	-	DC input	✓	✓	✓	✓		:
D4-32 ND 3-1(U-08N)	+	DC input	✓	✓	✓	✓		:
D4-32 ND 3-1(U-08N)	-	DC input	✓	✓	✓	✓		:
D4-32 ND 3-2(U-38N)	+	DC input	✓	✓	✓	✓		:
D4-32 ND 3-2(U-38N)	-	DC input	✓	✓	✓	✓		:
D4-64ND2(U-09N)	+	DC input	✓	✓	✓	✓		:
D4-64ND2(U-09N)	-	DC input	✓	✓	✓	✓		:
D4-08NA(U-20N)	+	AC input	✓	✓	✓	✓		:
D4-08NA(U-20N)	-	AC input	✓	✓	✓	✓		:
D4-16NA(U-25N)	+	AC input	✓	✓	✓	✓		:
D4-16NA(U-25N)	-	AC input	✓	✓	✓	✓		:
F4-08NE3S	+	AC/DC input	✓	✓	✓	✓		:
F4-08NE3S	-	AC/DC input	✓	✓	✓	✓		:
D4-16NE3(U-55N)	+	AC/DC input	✓	✓	✓	✓		:
D4-16NE3(U-55N)	-	AC/DC input	✓	✓	✓	✓		:
D4-08TD1(U-12T)	+	DC output	✓	✓	✓	✓		:
D4-08TD1(U-12T)	-	DC output	✓	✓	✓	✓		:
D4-16TD1(U-15T)	+	DC output	✓	✓	✓	✓		:
D4-16TD1(U-15T)	-	DC output	✓	✓	✓	✓		:
D4-16TD2(U-55T)	+	DC output	✓	✓	✓	✓		:
D4-16TD2(U-55T)	-	DC output	✓	✓	✓	✓		:
D4-32TD1(U-18T)	+	DC output	✓	✓	✓	✓		:
D4-32TD1(U-18T)	-	DC output	✓	✓	✓	✓		:
D4-32TD1-1(U-38T)	+	DC output	✓	✓	✓	✓		:
D4-32TD1-1(U-38T)	-	DC output	✓	✓	✓	✓		:

Device	pol	Port	ESD 8kv air	Burst Transients (KV)				Function check and Comments
				0.5	1	2	4	
D4-32TD2(U-58T)	+	DC output	✓	✓	✓	✓	✓	:
D4-32TD2(U-58T)	-	DC output	✓	✓	✓	✓	✓	:
D4-64TD1(U-19T)	+	DC output	✓	✓	✓	✓	✓	:
D4-64TD1(U-19T)	-	DC output	✓	✓	✓	✓	✓	:
D4-08TA(U-20T)	+	AC output	✓	✓	✓	✓	✓	:
D4-08TA(U-20T)	-	AC output	✓	✓	✓	✓	✓	:
D4-16TA(U-25T)	+	AC output	✓	✓	✓	✓	✓	:
D4-16TA(U-25T)	-	AC output	✓	✓	✓	✓	✓	:
D4-08TR(U-01T)	+	relay output	✓	✓	✓	✓	✓	:
D4-08TR(U-01T)	-	relay output	✓	✓	✓	✓	✓	:
F4-08TRS-1	+	relay output	✓	✓	✓	✓	✓	:
F4-08TRS-1	-	relay output	✓	✓	✓	✓	✓	:
F4-08TRS-2	+	relay output	✓	✓	✓	✓	✓	:
F4-08TRS-2	-	relay output	✓	✓	✓	✓	✓	:
D4-16TR(U-05T)	+	relay output	✓	✓	✓	✓	✓	:
D4-16TR(U-05T)	-	relay output	✓	✓	✓	✓	✓	:
F4-04AD(U-01AD-1)	+	analogue input	✓	✓	✓	✓	✓	CPU main immunity program Checked analogue accuracy
F4-04AD(U-01AD-1)	-	analogue input	✓	✓	✓	✓	✓	:
F4-04AD(U-01AD-1)	+	DC in		✓	✓	✓	✓	:
F4-04AD(U-01AD-1)	-	DC in		✓	✓	✓	✓	:
F4-08AD(U-8ADC-1)	+	analogue input	✓	✓	✓	✓	✓	:
F4-08AD(U-8ADC-1)	-	analogue input	✓	✓	✓	✓	✓	:
F4-08AD(U-8ADC-1)	+	DC in	✓	✓	✓	✓	✓	:
F4-08AD(U-8ADC-1)	-	DC in	✓	✓	✓	✓	✓	:
F4-04ADS	+	analogue input	✓	✓	✓	✓	✓	:
F4-04ADS	-	analogue input	✓	✓	✓	✓	✓	:
F4-04ADS	+	DC in		✓	✓	✓	✓	:
F4-04ADS	-	DC in		✓	✓	✓	✓	:
F4-08THM-K(U-8THM-K)	+	analogue input	✓	✓	✓	✓	✓	:
F4-08THM-K(U-8THM-K)	-	analogue input	✓	✓	✓	✓	✓	:
F4-08THM-K(U-8THM-K)	+	DC in		✓	✓	✓	✓	:
F4-08THM-K(U-8THM-K)	-	DC in		✓	✓	✓	✓	:
D4-02DA(U-01DA)	+	analogue output	✓	✓	✓	✓	✓	:
D4-02DA(U-01DA)	-	analogue output	✓	✓	✓	✓	✓	:
D4-02DA(U-01DA)	+	DC in		✓	✓	✓	✓	:
D4-02DA(U-01DA)	-	DC in		✓	✓	✓	✓	:

Device	pol	Port	ESD 8kv air	Burst Transients (KV)				Function check and Comments
				0.5	1	2	4	
F4-04DA(U-4DAC-2)	+	analogue output	✓	✓	✓	✓	✓	:
F4-04DA(U-4DAC-2)	-	analogue output	✓	✓	✓	✓	✓	:
F4-04DA(U-4DAC-2)	+	DC in		✓	✓	✓	✓	:
F4-04DA(U-4DAC-2)	-	DC in		✓	✓	✓	✓	:
F4-04DA-1	+	analogue output	✓	✓	✓	✓	✓	:
F4-04DA-1	-	analogue output	✓	✓	✓	✓	✓	:
F4-04DA-1	+	DC in		✓	✓	✓	✓	:
F4-04DA-1	-	DC in		✓	✓	✓	✓	:
F4-04DA-2	+	analogue output	✓	✓	✓	✓	✓	:
F4-04DA-2	-	analogue output	✓	✓	✓	✓	✓	:
F4-04DA-2	+	DC in		✓	✓	✓	✓	:
F4-04DA-2	-	DC in		✓	✓	✓	✓	:
F4-08DA-1	+	analogue output	✓	✓	✓	✓	✓	:
F4-08DA-1	-	analogue output	✓	✓	✓	✓	✓	:
F4-08DA-1	+	DC in		✓	✓	✓	✓	:
F4-08DA-1	-	DC in		✓	✓	✓	✓	:
D4-DCM(U-01DM)	+	RS232	✓	✓	✓	✓	✓	CPU main immunity program plus comms back to own CPU.
D4-DCM(U-01DM)	-	RS232	✓	✓	✓	✓	✓	:
D4-DCM(U-01DM)	+	RS422		✓	✓	✓	✓	:
D4-DCM(U-01DM)	-	RS422		✓	✓	✓	✓	:
F4-MAS-MB	+	port 1 RS232	✓	✓	✓	✓	✓	CPU main immunity program plus dummy cable.
F4-MAS-MB	-	port 1 RS232	✓	✓	✓	✓	✓	:
F4-MAS-MB	+	port 2 RS422		✓	✓	✓	✓	:
F4-MAS-MB	-	port 2 RS422		✓	✓	✓	✓	:
F4-SLV-MB	+	port 1 RS232	✓	✓	✓	✓	✓	:
F4-SLV-MB	-	port 1 RS232	✓	✓	✓	✓	✓	:
F4-SLV-MB	+	port 2 RS422		✓	✓	✓	✓	:
F4-SLV-MB	-	port 2 RS422		✓	✓	✓	✓	:
F4-SLV-MBR	+	port 1 RS422	✓	✓	✓	✓	✓	:
F4-SLV-MBR	-	port 1 RS422	✓	✓	✓	✓	✓	:
F4-SLV-MBR	+	port 2 RS232		✓	✓	✓	✓	:
F4-SLV-MBR	-	port 2 RS232		✓	✓	✓	✓	:
F4-SLV-TW	+	port 1 RS232	✓	✓	✓	✓	✓	:
F4-SLV-TW	-	port 1 RS232	✓	✓	✓	✓	✓	:
F4-SLV-TW	+	port 2 RS422		✓	✓	✓	✓	:
F4-SLV-TW	-	port 2 RS422		✓	✓	✓	✓	:

Device	pol	Port	ESD 8kv air	Burst Transients (KV)				Function check and Comments
				0.5	1	2	4	
F4-SDN	+	RS485	✓	✓	✓	✓	✓	:
F4-SDN	-	RS485	✓	✓	✓	✓	✓	:
F4-MAS-MBR	+	port 1	✓	✓	✓	✓	✓	:
F4-MAS-MBR	-	port 1	✓	✓	✓	✓	✓	:
F4-MAS-MBR	+	port 2		✓	✓	✓	✓	:
F4-MAS-MBR	-	port 2		✓	✓	✓	✓	:
D4-INT(U-01NI)	+	input	✓	✓	✓	✓	✓	CPU main immunity program
D4-INT(U-01NI)	-	input	✓	✓	✓	✓	✓	:
D4-HSC(U-01Z)	+	input	✓	✓	✓	✓	✓	:
D4-HSC(U-01Z)	-	input	✓	✓	✓	✓	✓	:
D4-HSC(U-01Z)	+	output		✓	✓	✓	✓	:
D4-HSC(U-01Z)	-	output		✓	✓	✓	✓	:
D4-HSC(U-01Z)	+	DC in		✓	✓	✓	✓	:
D4-HSC(U-01Z)	-	DC in		✓	✓	✓	✓	:
F4-16PID	+	none	✓					:
F4-16PID	-	none	✓					:
F4-4LTC(U-4LTC)	+	Tc input	✓	✓	✓	✓	✓	CPU main immunity program plus accuracy test.
F4-4LTC(U-4LTC)	-	Tc input	✓	✓	✓	✓	✓	:
F4-4LTC(U-4LTC)	+	discrete input		✓	✓	✓	✓	:
F4-4LTC(U-4LTC)	-	discrete input		✓	✓	✓	✓	:
F4-4LTC(U-4LTC)	+	output		✓	✓	✓	✓	:
F4-4LTC(U-4LTC)	-	output		✓	✓	✓	✓	:
F4-4LTC(U-4LTC)	+	DC in		✓	✓	✓	✓	:
F4-4LTC(U-4LTC)	-	DC in		✓	✓	✓	✓	:
F4-8MPI	+	input	✓	✓	✓	✓	✓	CPU main immunity program plus dummy cables.
F4-8MPI	-	input	✓	✓	✓	✓	✓	:
F4-8MPI	+	DC in		✓	✓	✓	✓	:
F4-8MPI	-	DC in		✓	✓	✓	✓	:
D4-16SIM(U-05S)	+	none	✓					CPU main immunity program
D4-16SIM(U-05S)	-	none	✓					:
D4-PULS-1(U-11PM)	+	DC in	✓	✓	✓	✓	✓	CPU main immunity program plus dummy cables.
D4-PULS-1(U-11PM)	-	DC in	✓	✓	✓	✓	✓	:
D4-PULS-1(U-11PM)	+	output		✓	✓	✓	✓	:
D4-PULS-1(U-11PM)	-	output		✓	✓	✓	✓	:
F4-SDS	+	RS485	✓	✓	✓	✓	✓	:
F4-SDS	-	RS485	✓	✓	✓	✓	✓	:
D4-HPP(S-01P), cable D4- HPCBL-1(S-30JP)	+	cable	✓	✓	✓	✓	✓	CPU main immunity program on standard 3mcable.
D4-HPP(S-01P), cable D4- HPCBL-1(S-30JP)	-	cable	✓	✓	✓	✓	✓	:
D4-HPP(S-01P), cable D4- HPCBL-1(S-30JP)	+	cassette port		✓	✓	✓	✓	:
D4-HPP(S-01P), cable D4- HPCBL-1(S-30JP)	-	cassette port		✓	✓	✓	✓	:

Declaration of conformity

This is to certify that the DL405 (SU) PROGRAMMABLE LOGIC CONTROL SYSTEM, comprising

Base assemblies	D4-04B(U-04B),D4-06B(U-06B),D4-08B(U-08B),D4-04BNX(U-04BJ),D4-06BNX(U-06BJ),D4-08BNX(U-08BJ), D4-04B-1(U-14B), D4-06B-1(U-16B), D4-08B-1(U-18B)
CPU 115/230vAC	D4-430(SU-5E), D4-440(SU-6B), D4-450(SU-SM)
CPU DC powered	D4-440DC-1(SU-6B-C), D4-440DC-2(SU-6B-Y)
Memory cartridges	D4-RAM-1(G-03M),D4-RAM-2(G-05M),D4-RNB(G-53M),D4-UV-1(G-14M), D4-UV-2(G-15M),D4-EE-2(G-25M)
Batteries (Lithium)	D4-MC-BAT(RB-7), D3-D4-BAT(RB-5)
115/230vAC expanders	D4-EX(U-01EW) with D4-EXCBL-1(U-10J), D4-EXCBL-2(U-05J)
DC powered expanders	D4-EXDC(U-01EW-C), D4-EXDC-2(U-01EW-Y)
Remote I/O	D4-RM(U-02RM), D4-RS(U-02RS), D4-RSDC(U-02RS-C)
Slave I/O	D4-SM(U-03RM), D4-SS-88(U-03RS-NT1), D4-SS-106(U-03RS-NT2), D4-SS-16T(U-03RS-T1), D4-SS-16N(U-03RS-N1)
CoProcessors	F4-CP128-1, F4-CP512.
DC Input modules	D4-08ND3S(U-50N),D4-16ND2(U-05N),D4-16ND2F(U-05NH),D4-32ND3-1(U-08N),D4-32ND3-2(U-38N),D4-64ND2(U-09N)
AC/DC input modules	D4-08NA(U-20N), D4-16NA(U-25N), F4-08NE3S, D4-16NE3(U-55N)
DC output modules	D4-08TD1(U-12T),D4-16TD1(U-15T),D4-16TD2(U-55T),D4-32TD1(U-18T), D4-32TD1-1(U-38T),D4-32TD2(U-58T), D4-64TD1(U-19T)
AC output modules	D4-08TA(U-20T), D4-16TA(U-25T)
Relay output modules	D4-08TR(U-01T), F4-08TRS-1, F4-08TRS-2, D4-16TR(U-05T)
Analogue inputs	F4-04AD(U-01AD-1), F4-08AD(U-8ADC-1), F4-04ADS, F4-08THM-n(U-8THM-n) [note: n=J,K,T,R,S,E,1,2,3 versions]
Analogue outputs	D4-02DA(U-01DA), F4-04DA(U-4DAC-2), F4-04DA-1, F4-04DA-2, F4-08DA-1
Comms modules	D4-DCM(U-01DM), F4-MAS-MB, F4-SLV-MB, F4-SLV-MBR, F4-SLV-TW, F4-SDN, F4-MAS-MBR, FA-UNICON
Special modules	D4-INT(U-01NI), D4-HSC(U-01Z), F4-16PID, F4-4LTC(U-4LTC), F4-8MPI, D4-16SIM(U-05S), D4-PULS-1(U-11PM), F4-SDS
Programming devices	D4-HPP(S-01P) with cable D4-HPCBL-1(S-30JP), D4-HPCBL-2(S-15JP)
Operator Terminal	D4-CASCBL(S-08JR), and PC programming cable D4-DSCBL* DV-1000(S-10D) with D4-1000CBL(Z-20JP)

Manufactured by

First code 'D'	Koyo Electronics Industries Co., Ltd. 1-171, Tenjin-cho, Kodaira-shi, Tokyo 187, Japan.
First code 'F'	FACTS Engineering Inc., 34760 U.S. Highway 19, Palm Harbor, Florida, 34684, USA.
*D4-DSCBL	PLC-Direct by Koyo, 3505 Hutchinson Road, Cumming, GA 30130, USA.

Conforms with the requirements of Council Directive 89/336/EEC, relating to **Electromagnetic Compatibility**, by the application of the following standards

EN50081-1:1992	Generic Domestic and Light Industrial Environment (Emission)
EN50081-2:1994	Generic Heavy Industrial Environment (Emission)
EN50082-1:1992	Generic Domestic and Light Industrial Environment (Immunity)
EN50082-2:1995	Generic Heavy Industrial Environment (Immunity)

Conforms with the requirements of Council Directive 73/23/EEC, known as the **Low Voltage Directive**, by the application of the following standards, for Installation Category 1, Pollution level 1.

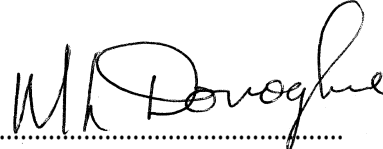
EN61010-1-1 :1993	Safety requirements for electrical equipment for measurement control and laboratory use.
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When properly installed to the PLC installation manual D4-USER-M, with note of the special requirements detailed in DA-EU-M, based on the European EMC, Low Voltage and Machinery directives, plus the recommendations included in the installation standards IEC 1000-5-1, IEC 1000-5-2, and IEC 1131-4.

It is a requirement that all PLC equipment must be housed in a protective steel enclosure, sealed against the ingress of moisture and polluting gases, and which limits access by operators for safety reasons by lock and power breaker. If access is required by operators and untrained personnel by removal of covers or opening doors, for the adjustment of controls, replacement of consumable materials, or to remove or change parts and options, then the PLC equipment must be installed inside an internal cover or secondary enclosure.

It should be noted that safety requirements of the Machinery directive standard EN60204-1 state that all control circuits and PLC power must be via isolation transformers or an isolating power supply, and one side of all AC or DC control circuits must be earthed, which is the same as Installation Category 1 of standard EN61010-1.

Both power input connections to a PLC must be separately fused using 3 amp T type anti-surge fuses, and a transient suppresser fitted to limit PLC supply and control circuit over voltages to 1500v maximum.

Signed	
Date	January 1st, 1997.
Name	ML Donoghue (being the responsible person appointed by the manufacturer)
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DAEUM July 1997	

Position	Product Evaluation Manager, UK Testing Facility
Location	PLC-Direct UK Division, 22A High Street, Caterham, CR3 5UA. England.