

Inputs E

Function No	Definition	FW
00:OFF	Permanent OFF signal (disabled)	1.00
01:PROG	Output assigned to REG-L (H-Code) use	1.00
02:SP2Level	Setpoint 2 activate (ON)	1.15
03:SP-1	Setpoint 1 activate (pulse)	1.23
04:SP-2	Setpoint 2 activate (pulse)	1.23
05:SP-3	Setpoint 3 activate (pulse)	1.23
06:SP-4	Setpoint 4 activate (pulse)	1.23
07:TC.i.Op	Tap Changer in Operation	1.15
08:Par-Prog	Parallel Program activate (only with Level or Pulse selected)	1.21
09:3Winding	Switch to regulation on U2	1.22
10:SP-Bin0	Setpoint change via BI (bit-coded - 00:SW1, 01:SW2, 10:SW3, 11:SW4)	2.03
11:SP-Bin1	Setpoint change via BI (bit-coded - 00:SW1, 01:SW2, 10:SW3, 11:SW4)	2.03
12:SyncReq	ABB_INDON: Synchronisation	1.27
13:Trans1	Pass through to Output labeled Trans1	1.27
14:Trans2	Pass through to Output labeled Trans2	1.27
15:BuchAlm	TMM: Buchholz Alarm	2.03
16:BuchTrip	TMM: Buchholz Trip	2.03
17:Oilpump1	TMM: Oil Pump 1 running	2.03
18:***	Not used	
19:***	Not used	
20:SP-incr.	Setpoint increment, e.g. per 1%	1.32
21:SP-decr.	Setpoint decrement, e.g. per 1%	1.32
22:Hand+	NLK: Special temporary Manual Mode with control only from Lower+ input	1.33
23:Lower+	NLK: Special one tap down command for Lower+	1.33
24:Inh.Low	Force Inhibit Low	1.00
25:Quick	Force High Speed tapping	1.19
26:PG_CB	PARAGRAMER: LV circuit-breaker	1.77
27:PG_IS1	PARAGRAMER: LV isolator bus 1	1.77
28:PG_IS2	PARAGRAMER: LV isolator bus 2	1.77
29:PG_CP	PARAGRAMER: LV bus coupling	1.77
30:PG_SC1	PARAGRAMER: LV bus section bus 1	1.77
31:PG_SC2	PARAGRAMER: LV bus section bus 2	1.77
32:PG_CBa	PARAGRAMER: LV 991101 Cross-Coupling	1.85
33:PG_CBb	PARAGRAMER: LV 991101 Cross-Coupling	1.85
34:PG_H_CB	PARAGRAMER: HV circuit-breaker	1.85
35:PG_H_IS1	PARAGRAMER: HV isolator bus 1	1.85
36:PG_H_IS2	PARAGRAMER: HV isolator bus 2	1.85
37:PG_H_CP	PARAGRAMER: HV bus coupler bus 1&2	1.85
38:PG_H_SC1	PARAGRAMER: HV bus section bus 1	1.85
39:PG_H_SC2	PARAGRAMER: HV bus section bus 2	1.85
40:PG_H_CBa	PARAGRAMER: HV 991101 Cross-Coupling	1.85
41:PG_H_CBb	PARAGRAMER: HV 991101 Cross-Coupling	1.85
42:up	Tap Raise command	1.85
43:down	Tap Lower command	1.85
44:BCD1	Tap position indication BCD 1	1.85
45:BCD2	Tap position indication BCD 2	1.85
46:BCD4	Tap position indication BCD 4	1.85
47:BCD8	Tap position indication BCD 8	1.85

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48:BCD10	Tap position indication BCD 10	1.85
49:BCD20	Tap position indication BCD 20	1.85
50:BCDminus	Tap position indication BCD minus sign	1.85
51:BIN16	Tap position indication binary BIN16	1.85
52:BIN32	Tap position indication binary BIN 32	1.85
53:LR_AH	REG-LR: Auto/Manual	1.97
54:LR_STAT	REG-LR: Status	1.97
55:PG_C1a	PARAGRAMEER LV CrossLink bus section a bus 1	1.91
56:PG_C1b	PARAGRAMEER LV CrossLink bus section b bus 1	1.91
57:PG_C2a	PARAGRAMEER LV CrossLink bus section a bus 2	1.91
58:PG_C2b	PARAGRAMEER LV CrossLink bus section b bus 2	1.91
59:PG_H_C1a	PARAGRAMEER HV CrossLink bus section a bus 1	1.91
60:PG_H_C1b	PARAGRAMEER HV CrossLink bus section b bus 1	1.91
61:PG_H_C2a	PARAGRAMEER HV CrossLink bus section a bus 2	1.91
62:PG_H_C2b	PARAGRAMEER HV CrossLink bus section b bus 2	1.91
63:LR_LR	REG-LR: Local/Remote	1.97
64:MSI_Ma	MSI: select regulator as Master	2.02
65:MSI_Sl	MSI: select regulator as Slave	2.02
66:MSI_Ind	MSI: select regulator as Independent	2.02
67:MSI_Ma1	MSI2: select regulator as Master of bus 1	2.02
68:MSI_Ma2	MSI2: select regulator as Master of bus 2	2.02
69:MSI_Sl1	MSI2: select regulator as Slave of bus 1	2.02
70:MSI_Sl2	MSI2: select regulator as Slave of bus 2	2.02
71:PG_IS3	PARAGRAMEER LV isolator bus 3	2.12
72:PG_CP2	PARAGRAMEER LV bus coupler bus 2&3	2.12
73:PG_CP3	PARAGRAMEER LV bus coupler bus 3&1	2.12
74:PG_SC3	PARAGRAMEER LV bus section bus 3	2.12
75:PG_H_IS3	PARAGRAMEER HV isolator bus 3	2.12
76:PG_H_CP2	PARAGRAMEER HV bus coupler bus 2&3	2.12
77:PG_H_CP3	PARAGRAMEER HV bus coupler bus 3&1	2.12
78:PG_H_SC3	PARAGRAMEER HV bus section bus 3	2.12
79:Oilpump2	TMM: Oil Pump 2 running	2.15
82:BCD40	Tap position indication BCD 40	2.22

Outputs REL

Function	Definition	FW
00:OFF	Permanent OFF signal (disabled)	1.00
01:PROG	Output assigned to REG-L (H-Code) use	1.00
02:ON	Permanent ON signal	1.00
03:<U	Undervoltage limit exceeded	1.00
04:>U	Overvoltage limit exceeded	1.00
05:>U+<U	Either Under- or Overvoltage limit exceeded	1.00
06:>I	Overcurrent limit exceeded	1.33
07:SP-1	Setpoint 1 active	1.23
08:SP-2	Setpoint 2 active	1.23
09:SP-3	Setpoint 3 active	1.23
10:SP-4	Setpoint 4 active	1.23
11:Inh.High	Inhibit (Blocked Mode) due to Overvoltage	1.00
12:Quick	high-response-rate voltage regulator	1.19
13:Inhibit	Inhibit (Blocked Mode) due to any reason	1.00
14:TC-Err	Tap Changer Error: tap incomplete when Max TC in Operation time elapsed	1.19
15:creepNBD	Creeping Net Breakdown tap blocking active	1.15
16:Manual	Manual Mode	1.16
17:ELAN-Err	ELAN Error	1.24
18:Par-Prog	Parallel Program Master active	1.21
19:3Winding	Limit violation by other winding when in auto	1.22
20:PhasFail	Fail of one phase in ARON measurement (hardware feature M2)	1.27
21:COM3Err	Com 3 Error (Remote IO)	2.15
22:TapMiMa	Tap Limiting: either Min tap or Max tap reached	2.22
23:Trans1	Pass through from Input labeled Trans1	1.27
24:/Trans1	Inversed pass through from Input labeled Trans1	1.27
25:Trans2	Pass through from Input labeled Trans2	1.27
26:/Trans2	Inversed pass through from Input labeled Trans2	1.27
27:OilAlarm	TMM: Oil Temperature Alarm	2.03
28:WndAlarm	TMM: Winding Temperature Alarm	2.03
29:WndTrip	TMM: Winding Temperature Trip	2.03
30:ParErr	Parallel Error: max Icirc or difference of taps exceeded	1.32
31:up	Tap Raise command	1.31
32:down	Tap Lower command	1.31
33:SP-incr	BBN 4.4.3: Setpoint Increase Input activated	1.32
34:SP-decr	BBN 4.4.3: Setpoint Decrease Input activated	1.32
35:TapMin	Tap Limiting: minimum tap reached	2.22
36:TapMax	Tap Limiting: maximum tap reached	2.22
37:Hand+	NLK: state of Hand+ input	1.33
38:<I	Undercurrent limit exceeded	1.33
39:InputErr	Binary Input card error	1.36
40:AUTO	Automatic Mode	1.36
41:TC-Err+	Tap Changer Error pulse	1.39
42:PANmiss	PAN monitoring unit cannot be reached	1.50
43:LV_Check	991101: Monitoring of parallel scheme for Eskom	1.85
44:HV_Check	991101: Monitoring of parallel scheme for Eskom	1.85
45:HV_Err	991101: Monitoring of parallel scheme for Eskom	1.85
46:HV_Fail	991101: Monitoring of parallel scheme for Eskom	1.85
47:Local	Local Mode	1.99

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48:Remote	Remote Mode	1.99
49:Heater	TMM: Heater activated	2.00
50:Cooler1	TMM: Cooling Level (fan group) 1 activated	2.00
51:Cooler2	TMM: Cooling Level (fan group) 2 activated	2.00
52:Cooler3	TMM: Cooling Level (fan group) 3 activated	2.00
53:Cooler4	TMM: Cooling Level (fan group) 4 activated	2.00
54:Cooler5	TMM: Cooling Level (fan group) 5 activated	2.00
55:Cooler6	TMM: Cooling Level (fan group) 6 activated	2.00
56:TempTC	TMM: Tap Changer Oil Temperature alarm	2.00
57:OilvTC-	TMM: Tap Changer Minimum Oil Level alarm	2.00
58:OilvTC+	TMM: Tap Changer Maximum Oil Level alarm	2.00
59:OilvTr-	TMM: Transformer Minimum Oil Level alarm	2.00
60:OilvTr+	TMM: Transformer Maximum Oil Level alarm	2.00
61:Water	TMM: Water in Oil alarm	2.00
62:Gas	TMM: Gas in Oil alarm	2.00
63:BuchAlm	TMM: Buchholz alarm (from input with same function)	2.00
64:BuchTrip	TMM: Buchholz trip (from input with same function)	2.00
65:COM2Act	COM2 (SCADA) port active	2.00
66:MSI_Ma	MSI: regulator is a Master	2.00
67:MSI_Sl	MSI: regulator is a Slave	2.00
68:MSI_Ind	MSI: regulator is Independent	2.00
69:TAPERR	Tap Error: unexpected tap position received after tap command	2.00
70:HvLvDiff	HVLVCONTROL: Different parallel condition between LV and HV buses	2.00
71:T60s/1s	1 second pulse every minute	2.00
72:Inh.Low	Inhibit (Blocked Mode) due to Undervoltage	2.00
73:HUNTING	Hunting detected – can only be triggered from H-Code	2.07
74:OilPump	TMM: Oil Pump 1 activated	2.07
75: MSI_Ma1	MSI2: regulator is Master of bus 1	2.10
76: MSI_Ma2	MSI2: regulator is Master of bus 2	2.10
77: MSI_Sl1	MSI2: regulator is Slave of bus 1	2.10
78: MSI_Sl2	MSI2: regulator is Slave of bus 2	2.10
79:T1h/1s	1 second pulse every hour	2.10
80:H2	TMM: H2 limit exceeded	2.11
81:CO	TMM: CO limit exceeded	2.11
82:dCosEmgy	dCos(phi) Emergency Mode activated (Circulating Current schemes only)	2.11
83:PG_INERR	PARAGRAMMER: error state for inverted and non-inverted PG input	2.13
84:OilPump2	TMM: Oil Pump 2 activated	2.15
85:AMaster	Regulator is a Master in a parallel scheme	2.22
86:Aslave	Regulator is a Slave in a parallel scheme	2.22
87:Ind	Regulator is Independent	2.22
88:ParProg+	Group signal of the active states Parallel (P), Master (M) and Slave (S)	2.22
89:BCD1	BCD input labeled BCD1 is on	2.22
90:BCD2	BCD input labeled BCD2 is on	2.22
91:BCD4	BCD input labeled BCD4 is on	2.22
92:BCD8	BCD input labeled BCD8 is on	2.22
93:BCD10	BCD input labeled BCD10 is on	2.22
94:BCD20	BCD input labeled BCD20 is on	2.22
95:BCD40	BCD input labeled BCD40 is on	2.22
96:BCDminus	BCD input labeled BCDminus is on	2.22
101:Input-01..	Input 1 to 32 is on (physical input, not inversed)	2.10

LEDs

Function No	Definition	FW
00: OFF	Permanent OFF signal (disabled)	1.00
01: PROG	Output assigned to REG-L (H-Code) use	1.00
02: up	Tap Raise command	1.15
03: down	Tap Lower command	1.15
04: up/down	Tap Raise or Lower command	1.15
05: SP-1	Setpoint 1 active	1.23
06: SP-2	Setpoint 2 active	1.23
07: SP-3	Setpoint 3 active	1.23
08: SP-4	Setpoint 4 active	1.23
09: Inh.High	Inhibit (Blocked Mode) due to Overvoltage	1.00
10: Quick	high-response-rate voltage regulator	1.19
11: Inhibit	Inhibit (Blocked Mode) due to either Under- or Overvoltage	1.00
12: TC-Err	Tap Changer Error: tap incomplete when Max TC in Operation time elapsed	1.19
13: creepNBD	Creeping Net Breakdown tap blocking active	1.15
14: ELAN-L	ELAN Left active	1.24
15: ELAN-R	ELAN Right active	1.24
16: ELAN-Err	ELAN Error	1.24
17: Par-Prog	Parallel Program Master active	1.21
18: 3Winding	Limit violation by other winding when in auto	1.22
19: PhasFail	Fail of one phase in ARON measurement (hardware feature M2)	1.27
20: TapMiMa	Tap Limiting: either Min tap or Max tap reached	2.22
21: COM3Err	Com 3 Error (Remote IO)	2.15
22: Trans1	Pass through from Input labeled Trans1	1.27
23: /Trans1	Inversed pass through from Input labeled Trans1	1.27
24: Trans2	Pass through from Input labeled Trans2	1.27
25: /Trans2	Inversed pass through from Input labeled Trans2	1.27
26: Oil Alarm	TMM: Oil Temperature Alarm	2.03
27: WndAlarm	TMM: Winding Temperature Alarm	2.03
28: WndTrip	TMM: Winding Temperature Trip	2.03
29: ParErr	Parallel Error: max Icirc or difference of taps exceeded	1.32
30: SP-incr	BBN 4.4.3: Setpoint Increase Input activated	1.32
31: SP-decr	BBN 4.4.3: Setpoint Decrease Input activated	1.32
32: TapMin	Tap Limiting: minimum tap reached	2.22
33: TapMax	Tap Limiting: maximum tap reached	2.22
34: Hand+	NLK: state of Hand+ input	1.33
35: <I	Undercurrent limit exceeded	1.33
36: InputErr	Binary Input card error	1.36
37: PANmiss	PAN monitoring unit cannot be reached	1.50
38: TC.i.Op	Tap Change in Operation	1.81
39: LV_Check	991101: Monitoring of parallel scheme for Eskom	1.85
40: HV_Check	991101: Monitoring of parallel scheme for Eskom	1.85
41: HV_Err	991101: Monitoring of parallel scheme for Eskom	1.85
42: HV_Fail	991101: Monitoring of parallel scheme for Eskom	1.85
43: Local	Local Mode	1.99
44: Remote	Remote Mode	1.99
45: <U	Undervoltage limit exceeded	2.00
46: >U	Overvoltage limit exceeded	2.00
47: >I	Overcurrent limit exceeded	2.00

REG IO & LED Definitions

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48: Heater	TMM: Heater activated	2.00
49: Cooler1	TMM: Cooling Level (fan group) 1 activated	2.00
50: Cooler2	TMM: Cooling Level (fan group) 2 activated	2.00
51: Cooler3	TMM: Cooling Level (fan group) 3 activated	2.00
52: Cooler4	TMM: Cooling Level (fan group) 4 activated	2.00
53: Cooler5	TMM: Cooling Level (fan group) 5 activated	2.00
54: Cooler6	TMM: Cooling Level (fan group) 6 activated	2.00
55: TempTC	TMM: Tap Changer Oil Temperature alarm	2.00
56: OilvTC-	TMM: Tap Changer Minimum Oil Level alarm	2.00
57: OilvTC+	TMM: Tap Changer Maximum Oil Level alarm	2.00
58: OilvTr-	TMM: Transformer Minimum Oil Level alarm	2.00
59: OilvTr+	TMM: Transformer Maximum Oil Level alarm	2.00
60: Water	TMM: Water in Oil alarm	2.00
61: Gas	TMM: Gas in Oil alarm	2.00
62: BuchAlm	Buchholz alarm (from input with same function)	2.00
63: BuchTrip	Buchholz trip (from input with same function)	2.00
64: COM1Act	COM1 (engineering) port active	2.00
65: COM2Act	COM2 (SCADA) port active	2.00
66: MSI_Ma	MSI: regulator is a Master	2.00
67: MSI_Sl	MSI: regulator is a Slave	2.00
68: MSI_Ind	MSI: regulator is Independent	2.00
69: TAPERR	Tap Error: unexpected tap position received after tap command	2.00
71: T60s/1s	1 second pulse every minute	2.00
72: Inh.Low	Inhibit (Blocked Mode) due to Undervoltage	2.00
73: Hunting	Hunting detected – can only be triggered from H-Code	2.17
74: OilPump1	TMM: Oil Pump 1 activated	2.07
75: MSI_Ma1	MSI2: regulator is Master of bus 1	2.10
76: MSI_Ma2	MSI2: regulator is Master of bus 2	2.10
77: MSI_Sl1	MSI2: regulator is Slave of bus 1	2.10
78: MSI_Sl2	MSI2: regulator is Slave of bus 2	2.10
79: T1h/1s	1 second pulse every hour	2.10
80: H2	TMM: H2 limit exceeded	2.11
81: CO	TMM: CO limit exceeded	2.11
82: dcosEmgy	dCos(phi) Emergency Mode activated (Circulating Current schemes only)	2.11
83: PG_INERR	PARAGRAMMER: error state for inverted and non-inverted PG input	2.13
84: OilPump2	TMM: Oil Pump 2 activated	2.15
85: AMaster	Regulator is a Master in a parallel scheme	2.22
86: ASlave	Regulator is a Slave in a parallel scheme	2.22
87: Ind	Regulator is Independent	2.22
88: ParProg+	Group signal of the active states Parallel (P), Master (M) and Slave (S)	2.22
89: BCD1	BCD input labeled BCD1 is on	2.22
90: BCD2	BCD input labeled BCD2 is on	2.22
91: BCD4	BCD input labeled BCD4 is on	2.22
92: BCD8	BCD input labeled BCD8 is on	2.22
93: BCD10	BCD input labeled BCD10 is on	2.22
94: BCD20	BCD input labeled BCD20 is on	2.22
95: BCD40	BCD input labeled BCD40 is on	2.22
96: BCDMinus	BCD input labeled BCDminus is on	2.22
101: Input-01..	Input 1 to 32 is on (physical input, not inverted)	2.10