

# ARCTEQ

RELYABLE POWER



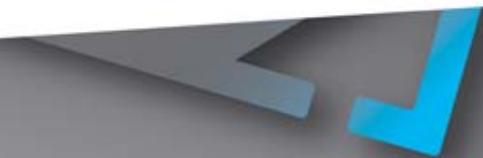
## Load shedding solution by F215

30.1.2015

# AQ F215 for Intelligent Load Shedding Solution



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## AQ F215 for Intelligent Load Shedding Solution

### Why load shedding (PQVIF) :

The deliberate shutdown of **electric power** in a part or parts of a **power**-distribution system, generally to prevent the failure of the entire system when the demand strains the capacity of the system.

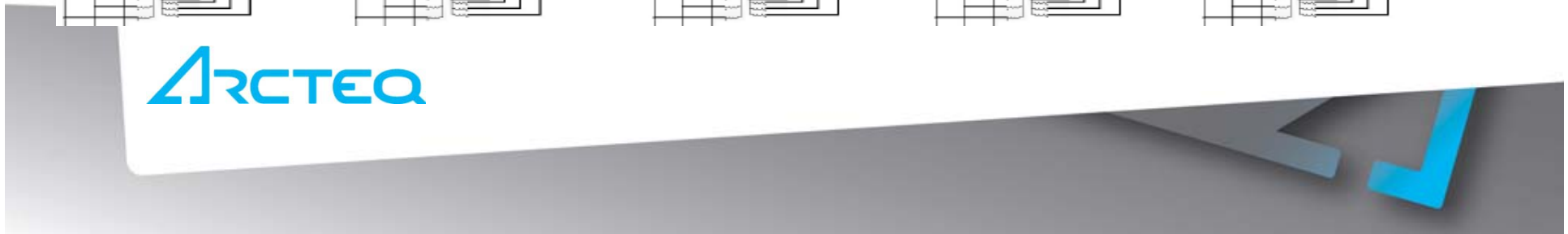
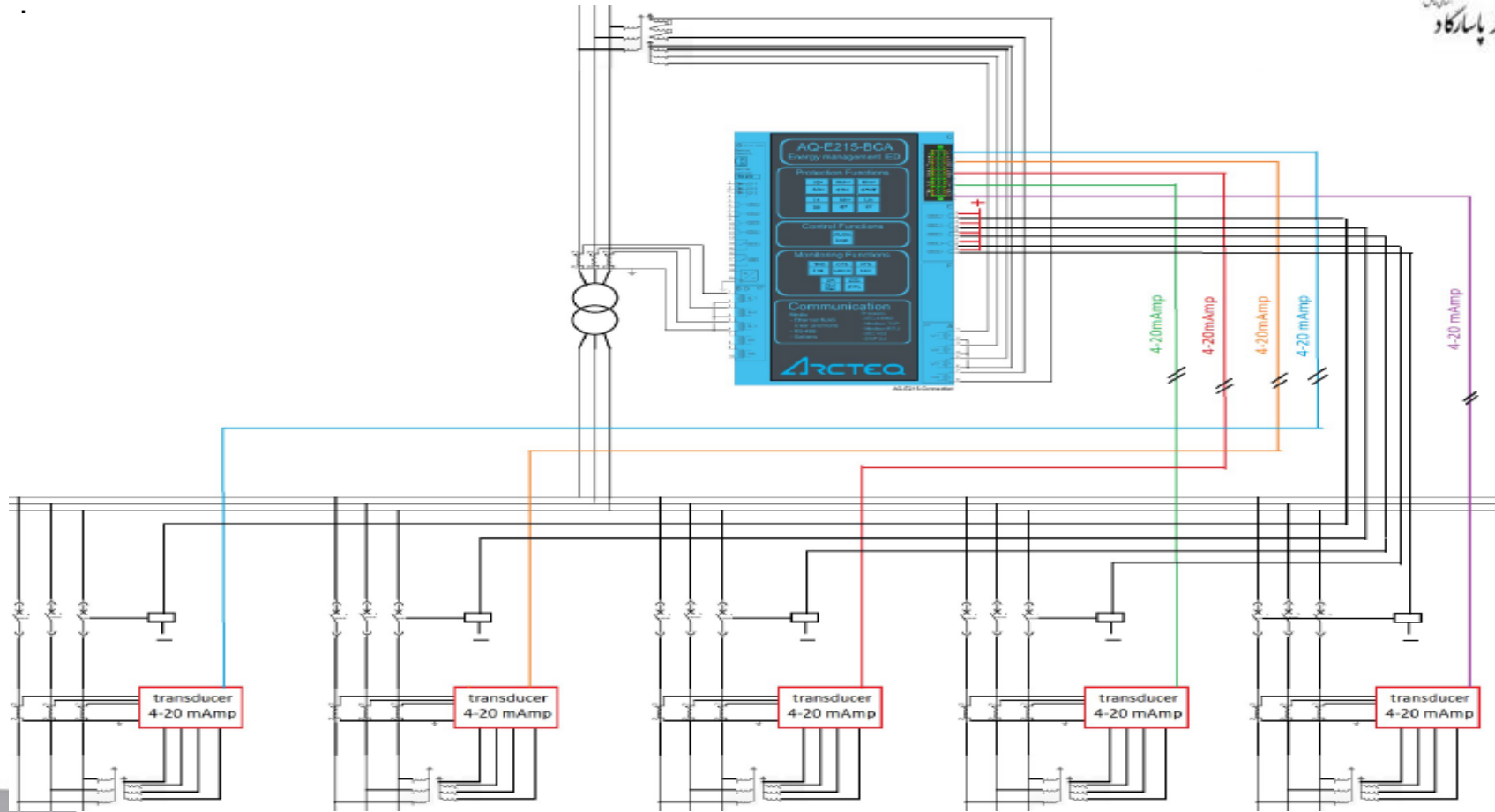
ARCTEQ provides Intelligent , flexible and programmable LD via verity of parameters.

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# AQ F215 for Intelligent Load Shedding solution

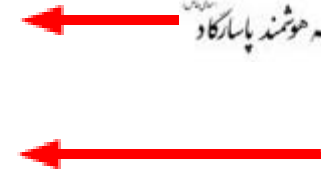
Sample solution for Intelligent LD Selecting feeders with priority



# AQ F215 for Intelligent Load Shedding solution



عرضه هوشمند پاسارگاد



Three-phase overcurrent, 4 stages INST, DT or IDMT (50/51)

Earth-fault (sensitive), 4 stages INST, DT or IDMT (50/51N)

Directional overcurrent, 4 stages INST, DT or IDMT (67)

Directional earth-fault, 4 stages INST, DT or IDMT (67N)

Transient earth-fault (67NT)

Harmonic overcurrent / inrush blocking, 4 stages INST, DT or IDMT (50/51H, 68)

Current unbalance / broken conductor, 4 stages INST, DT or IDMT 46/46R/46L)

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High/low impedance restricted earth fault / cable end differential \* (87N)

Cable thermal protection (49L)

Overvoltage, 4 stages INST, DT or IDMT (59)

Undervoltage, 4 stages INST, DT or IDMT (27)

Zero sequence overvoltage, 4 stages INST, DT or IDMT (59N)

Negative/positive sequence overvoltage, 4 stages INST, DT or IDMT (47)

Vector jump, 1 stage (78) Over/under frequency, 8 stages INST or DT (81O/81U)



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Rate of change of frequency, 8 stages INST or DT or IDMT (81R)



Over/Under/Reverse power (32/37/32R)

Breaker failure protection (50BF/52BF)

Arc protection (option) (50ARC/50NARC)

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# AQ F215 for Intelligent Load Sheddingsolution



Controllable objects: 5

Synchro-check (25)

Autorecloser (79)

Cold-load pick-up block

Switch onto fault logic

8 setting groups



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# AQ F215 for Intelligent Load Sheddingsolution



Phase and residual currents (IL1, IL2, IL3, I01, I02)

Voltage measurements (UL1-UL3, U12-U31, U0, SS)

Current and voltage THD and harmonics (up to 31st)

Frequency (f)

Power (P, Q, S, pf)

Energy (E+, E-, Eq+, Eq-)

Circuit breaker wear (CBW)

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# AQ F215 for Intelligent Load Shedding solution



Disturbance recorder (3.2 kHz)

Current transformer supervision (CTS)

Fuse failure (VTS)

Trip circuit supervision (TCS)

## EVENT RECORDING

Non-volatile disturbance records: 100

Non-volatile event records: 15000

The logo for ARCTEQ, featuring the word 'ARCTEQ' in a blue, sans-serif font with a stylized 'A'.



# AQ F215 for Intelligent Load Sheddingsolution



Current inputs: 5

Voltage inputs: 4

Digital inputs: 3 (standard)

Output relays: 5+1 (standard)

## OPTIONS (3 SLOTS)

Digital inputs optional: +8/16/24

Digital outputs optional: +5/10/15

Arc protection (12 sensors +2xHSO +BI)

2 x mA input + 6-8 x RTD input

Communication media (specified below)



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# AQ F215 for Intelligent Load Shedding solution



RJ 45 Ethernet 100Mb (front standard)

RJ 45 Ethernet 100Mb and RS 485 (rear standard)

Double LC Ethernet 100Mb (option)

RS232 + serial fibre PP/PG/GP/GG (option)

## COMMUNICATION PROTOCOLS

IEC 61850

IEC 60870-5-103/101/104

Modbus RTU, Modbus TCP/IP

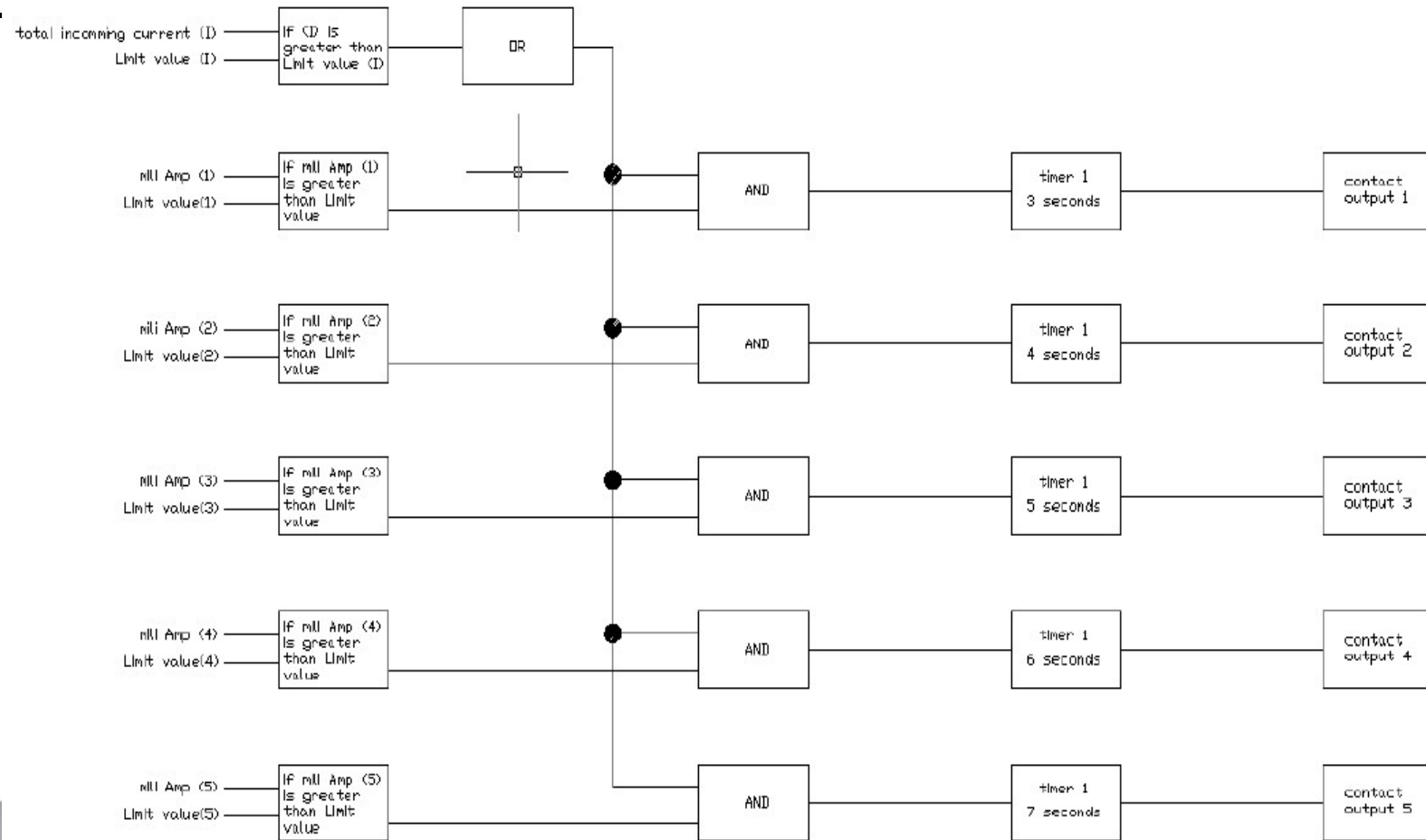
DNP 3.0, DNP 3.0 over TCP/IP

SPA

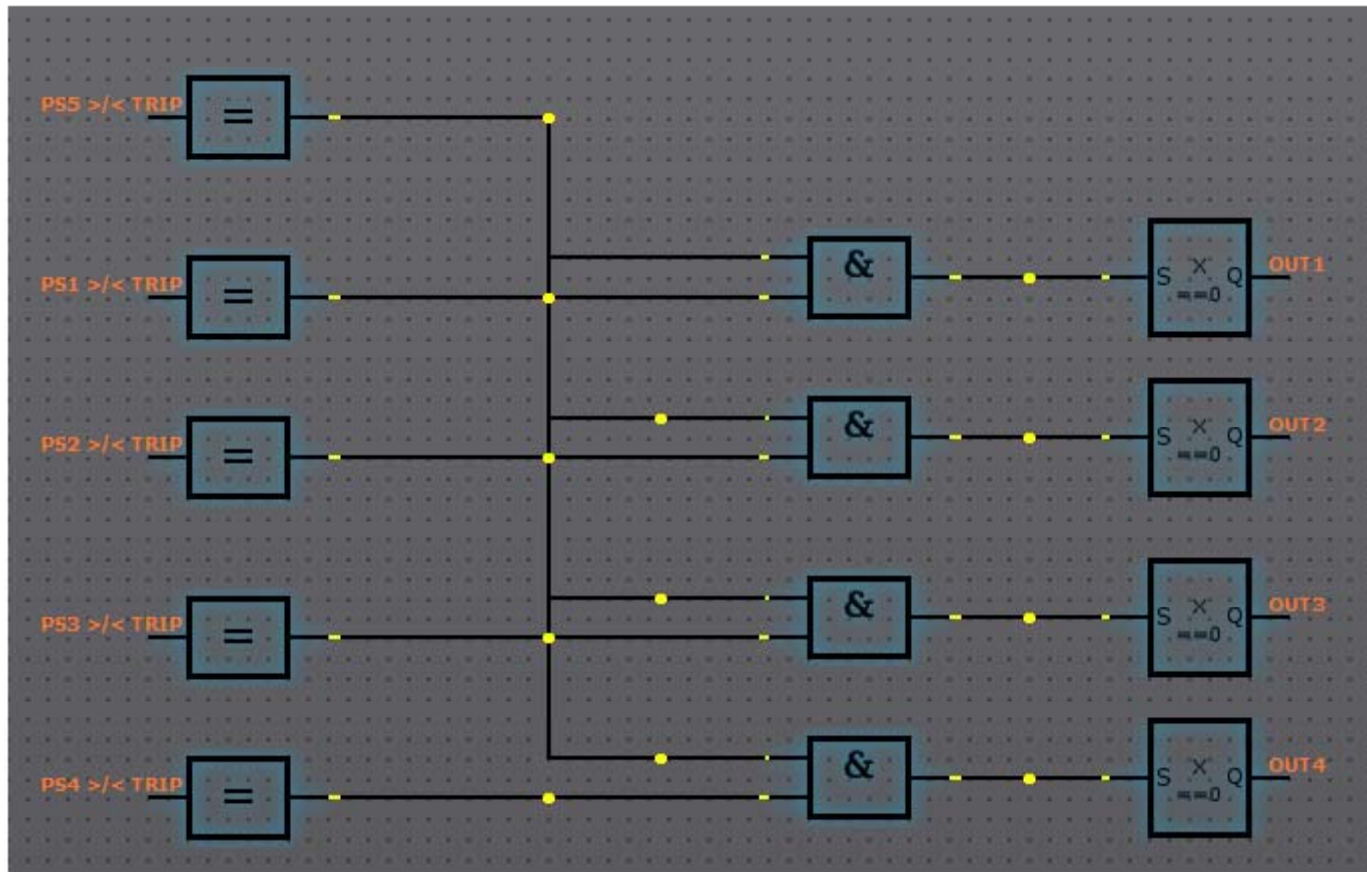


# AQ F215 for Intelligent Load Shedding solution

## Flexible Logic mA or BI for preparing Logic



# AQ F215 for Intelligent Load Shedding solution



# AQ F215 for Intelligent Load Sheddingsolution



Protection Settings

Programmable Stages PGx >/< [99]

Protection Settings

INFO SETTINGS REGISTERS IO EVENTS

Protection Settings

SETTING GROUP1 SETTING GROUP2

Setting Name	Value	Unit
P51 Pick-up terms Mag1	Over >	
P51 Pick-up setting Mag1/calc. > / <	10	Desired mA value
P51 Setting hysteresis Mag1	3	%set
P51 Definite operating time delay	0	s
P51 Release Time delay	0	s
P52 Pick-up terms Mag1	Over >	
P52 Pick-up setting Mag1/calc. > / <	10	Desired mA value
P52 Setting hysteresis Mag1	3	%set
P52 Definite operating time delay	0	s
P52 Release Time delay	0	s
P53 Pick-up terms Mag1	Over >	
P53 Pick-up setting Mag1/calc. > / <	10	Desired mA value
P53 Setting hysteresis Mag1	3	%set
P53 Definite operating time delay	0	s
P53 Release Time delay	0	s

# AQ F215 for Intelligent Load Shedding solution



**Programmable stage 1 configuration**

PS1 > /< Measurement setting

PS1 Magnitude selection

PS1 Magnitude1 (Others)

PS1 Magnitude1 multiplier

PS1 Scaled Magnitude1

PS1 > /< MeasMag1/MagSet1 at the moment

One magnitude como

Others

mA Inout7

1 xMag1

-5000000.000000..5000000.000000 [0.000001]

0 xMag1

0.000000..1250.000000 [0.000001]

0 p.u.

0.00..1250.00 [0.01]

---

**Programmable stage 2 configuration**

PS2 > /< Measurement setting

PS2 Magnitude selection

PS2 Magnitude1 (Others)

PS2 Magnitude1 multiplier

PS2 Scaled Magnitude1

PS2 > /< MeasMag1/MagSet1 at the moment

One magnitude como

Others

mA Inout8

1 xMag1

-5000000.000000..5000000.000000 [0.000001]

0 xMag1

0.000000..1250.000000 [0.000001]

0 p.u.

0.00..1250.00 [0.01]





# AQ F215 for Intelligent Load Shedding solution



Stage	Unit	Range	Input Type
S9 Sensor		-101.0...2000.0 [0.1]	Invalid
S10 Measurement	deg	-101.0...2000.0 [0.1]	Invalid
S10 Sensor		-101.0...2000.0 [0.1]	Invalid
S11 Measurement	deg	-101.0...2000.0 [0.1]	Invalid
S11 Sensor		-101.0...2000.0 [0.1]	Invalid
S12 Measurement	deg	-101.0...2000.0 [0.1]	Invalid
S12 Sensor		-101.0...2000.0 [0.1]	Invalid
S13 Measurement	deg	-101.0...2000.0 [0.1]	Invalid
S13 Sensor		-101.0...2000.0 [0.1]	Invalid
S14 Measurement	deg	-101.0...2000.0 [0.1]	Invalid
S14 Sensor		-101.0...2000.0 [0.1]	Invalid
S15 Measurement mA	mA	0.000...20.000 [0.001]	Invalid
S15 Sensor		0.000...20.000 [0.001]	Invalid
S16 Measurement mA	mA	0.000...20.000 [0.001]	Invalid
S16 Sensor		0.000...20.000 [0.001]	Invalid



# AQ F215 for Intelligent Load Shedding solution



Programmable Stages PGx >/< [99]   RTD and mA inputs   RTD   Setting Groups

### Programmable Stages PGx >/< 99 [PGS1]

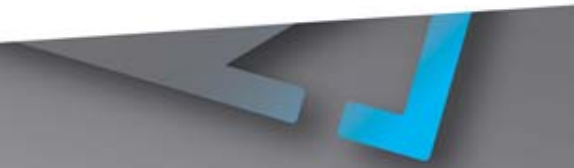
INFO   SETTINGS   **REGISTERS**   IO   EVENTS

#### REGISTERS: Programmable Stage PGx>/<

Programmable Stage PS1 >/< Register   Programmable Stage PS2 >/< Register   Programmable Stage PS3 >/< Register   Programmable Stage PS4 >/< Register

	PS1 >/< Event	PS1 >/< Time	PS1 >/< Mag1	'S1 >/< Mag1/Set1	PS1 >/< Mag2	'S1 >/< Mag2/Set2	PS1 >/< Mag3	'S1 >/< Mag3/Set3	>/< Trip time remai	/< Setting
1	PS1 >/< Trip ON	04.02.1981 06:37:52.817	4.935915	2.742175	0.000000	0.000000	0.000000	0.000000	0.000000	SG
2	PS1 >/< Trip ON	04.02.1981 06:37:38.209	3.375098	1.875054	0.000000	0.000000	0.000000	0.000000	0.000000	SG
3	PS1 >/< Trip ON	04.02.1981 06:25:29.525	3.137349	1.742972	0.000000	0.000000	0.000000	0.000000	0.000000	SG
4	PS1 >/< Trip ON	04.02.1981 06:22:29.590	3.060415	1.700231	0.000000	0.000000	0.000000	0.000000	0.000000	SG
5	PS1 >/< Trip ON	04.02.1981 06:12:14.390	3.147930	1.748850	0.000000	0.000000	0.000000	0.000000	0.000000	SG
6	PS1 >/< Trip ON	04.02.1981 06:09:34.511	2.536284	1.409047	0.000000	0.000000	0.000000	0.000000	0.000000	SG
7	PS1 >/< Trip ON	04.02.1981 06:07:30.127	2.502896	1.390498	0.000000	0.000000	0.000000	0.000000	0.000000	SG
8	PS1 >/< Trip ON	04.02.1981 05:56:57.923	3.032222	1.684568	0.000000	0.000000	0.000000	0.000000	0.000000	SG
9	PS1 >/< Trip ON	04.02.1981 05:56:21.938	2.659463	1.477479	0.000000	0.000000	0.000000	0.000000	0.000000	SG
10	PS1 >/< Trip ON	04.02.1981 05:54:45.216	2.627341	1.459634	0.000000	0.000000	0.000000	0.000000	0.000000	SG

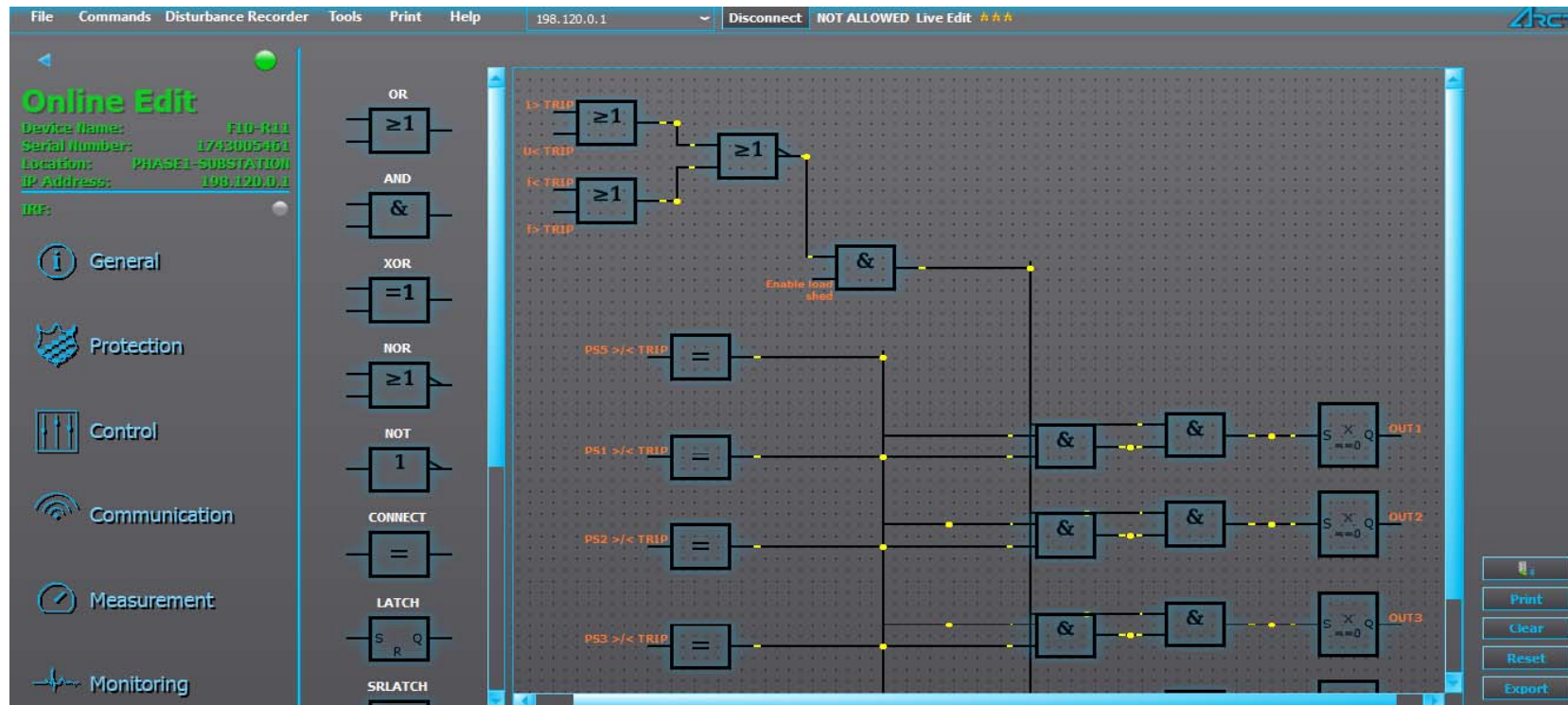
PS1 >/< Clear registers



# Aqtivate 200 Setting & Configuration Software



Felexible Logic

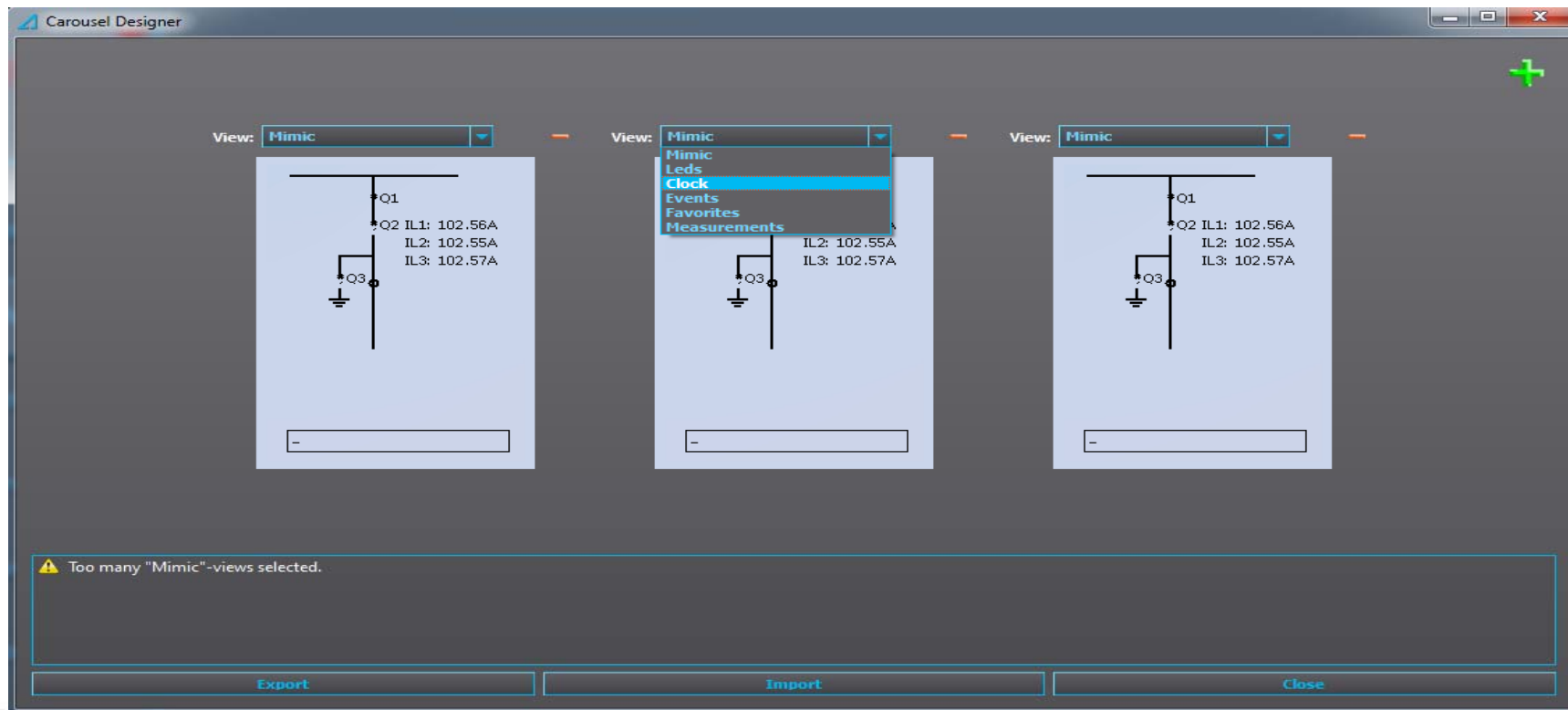


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# Aqtivate 200 Setting & Configuration Software



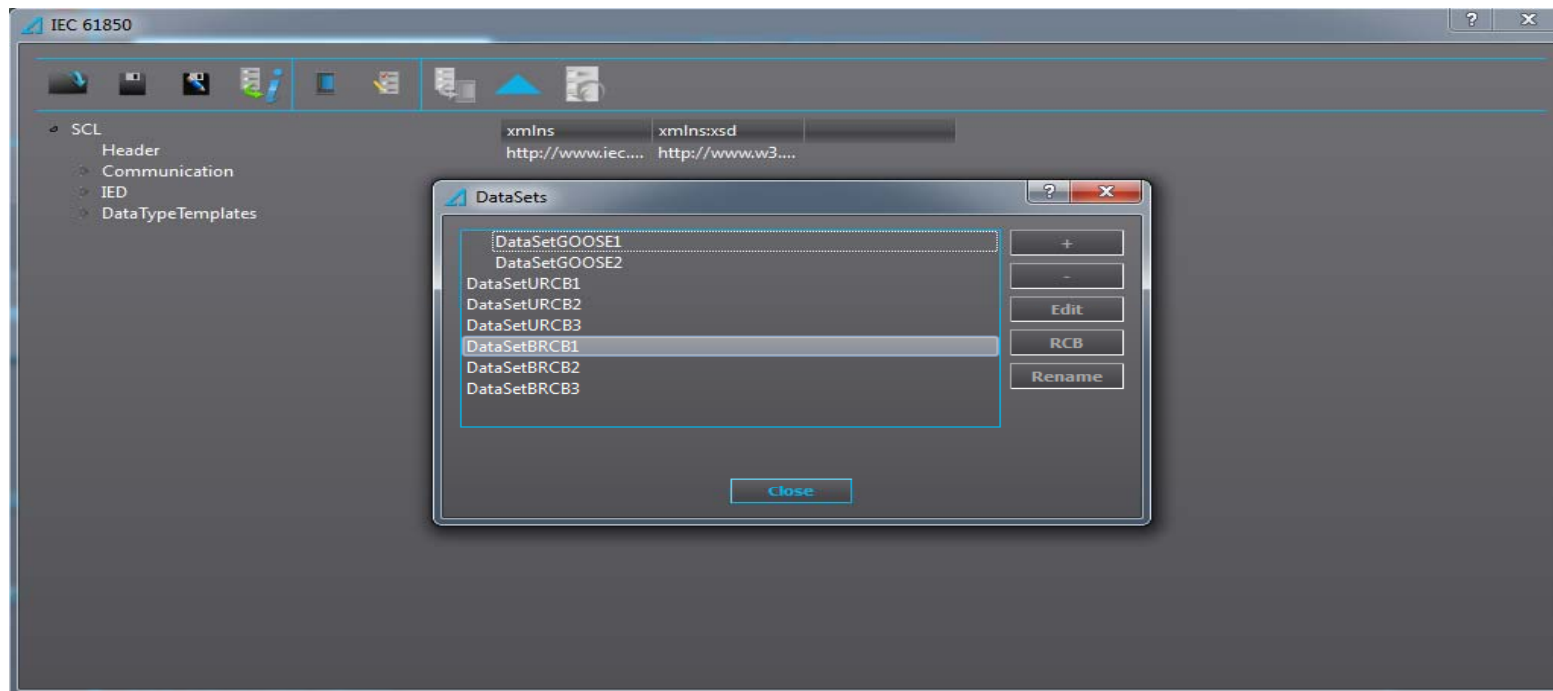
HMI in several pages



# Aqtivate 200 Setting & Configuration Software



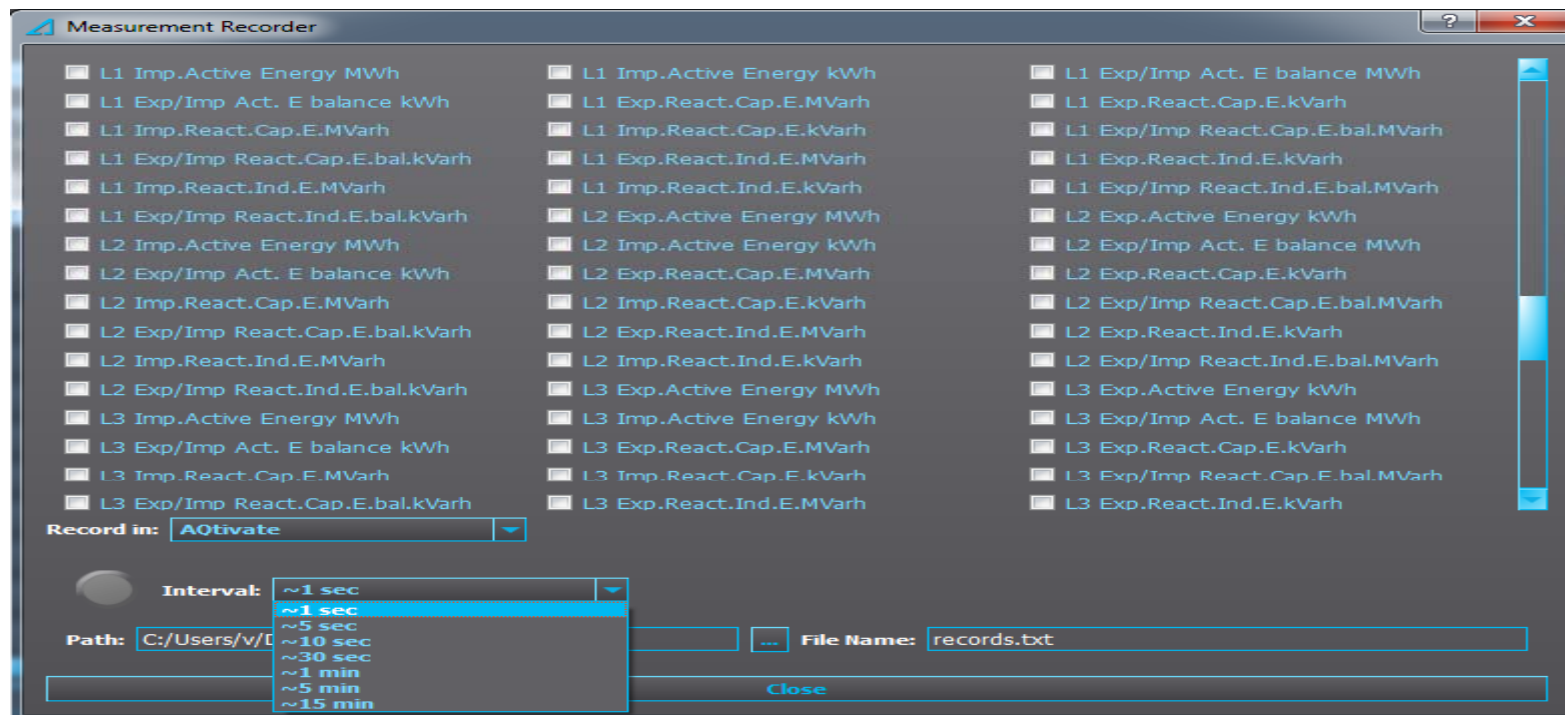
Buffered and unbuffered SAS signals



# Aqtivate 200 Setting & Configuration Software



Default Daily report Archives

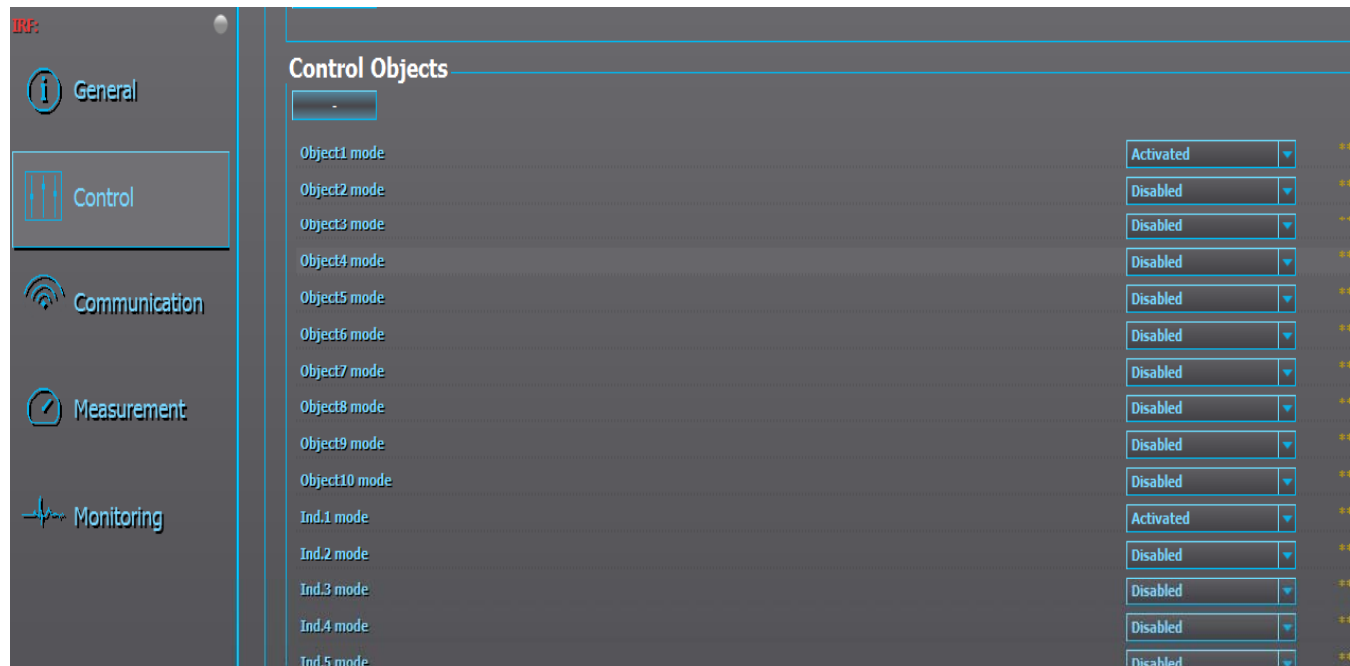


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# Activate Control and Monitoring Devices



10 DI Command+5 DI Ppsition



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# Aqtivate 200 Setting & Configuration Software



Analogue input in Flex Logic

Item	Value	Unit
S9 Sensor	Invalid	
S10 Measurement	0	deg
S10 Sensor	Invalid	
S11 Measurement	0	deg
S11 Sensor	Invalid	
S12 Measurement	0	deg
S12 Sensor	Invalid	
S13 Measurement	0	deg
S13 Sensor	Invalid	
S14 Measurement	0	deg
S14 Sensor	Invalid	
S15 Measurement mA	0	mA
S15 Sensor	Invalid	
S16 Measurement mA	0	mA
S16 Sensor	Invalid	

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# AQ F215 for Intelligent Load Shedding solution

- DCS/SMS Solution for conventional SS
- Monitoring
- Command
- HMI
- Synchronizing
- Fault/Event Recorder
- Flexible Logice
- Several HMI pages
- Fault recorder
- Online changes
- Connecting to SAS Systems
- Several Default Standard Protocols
- Simple Software
- Protection and Control Functions
- Analogue Inputs
- Frequency Independent Behavior

