

PRODUCT CATALOGUE 2011



Medium Voltage Soft Starters
Low Voltage Soft Starters
DC Injection Brake
Thyristor Power Supply
Cathodic Protection

Igel 
Elektronik GmbH

Igel – The Drive Technology Integrator










Designated applications

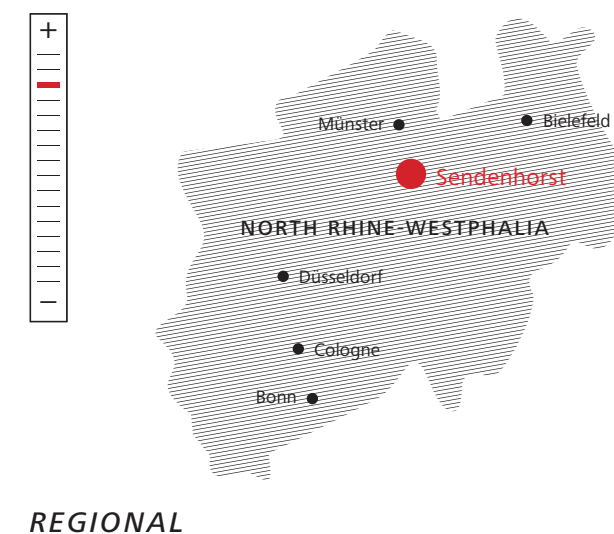
The following table assigns IgelElektroniks' comprehensive product range to the appropriate application for each product line.

		Soft Starters								DC Injection Brake
		ISA-HD	ISA-B2P	ISA-B	ISA-A2P	ISA-A	ISA-DS	ISA-D	ISA-OEM	IMB
Pumps	Submersible	x	o	o	o	o	x	x	x	
	Centrifugal	x	o	o	o	o	x	x	x	
Fans	Axial	x			o	o	o	x		
	Radial	x			o	o	o	x		
Compressor	Piston	x		o	o	o	x	x		
	Screw	x	o	o	o	o	x	x		
Chiller		x	x	x	x	x	x	x	x	
Shredder		x						x		
Mill		x					o	x		
Crusher		x						x		
Conveyor belt		x					o	x		
Milling mashine		x	x	x	x	x	x	x	x	x
Saw		x	x	x	x	x	x	x	x	x
Mixer		x		o	o	o	o	x		
Blower		x	o	o	o	o	x	x		
Screw conveyor		x		o				x	x	
Centrifuge		x						x		o
Cement pump		x		o				x		

o – well suited
x – partly suited

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Company History

Founded in 2001, by ex-Fanal Wuppertal employees, Igel dispose of a combined experience of over 25 years in drive technology. Our long term cooperation with leading international component manufacturers since the beginning of the 80's, gives us a leading edge in the soft starters market, thus provides our customers with advanced technology and long term reliability. Igel Elektronik became technology leader with the world's largest product range of soft starters. The first fully withdrawable medium voltage switchgear MV-CS, which has been presented in 2009, emphasizes the advancement in order to become Drive Technology Integrator.

Business Activities

As a specialist in drive technology we integrate systems and projects as well as supply single component for each project. We provide our customers with advanced design, unique in its cost effective performance and support our customers in throughout, from defining their needs to supplying a turn key solution. Some of our leading advantages are:

- Application solution from concept to delivery
- Design engineering to the highest specifications
- Calculation of technical data
- Solution Development and drive assembly
- Components Installation
- On site service

Philosophy

Together with our customers we have accepted the global market challenges and our increasing sales have proven our concept to be well perceived. In 2010 the direct and indirect export has been more than 70 per cent. Our product range covers all worldwide voltage levels and guarantees our customers the drive solution from one source and reduces development- and adjustment costs. We provide supreme local service and support in every geographical zone where we focus our activities.

Quality

To the international customer a "Made in Germany" product is perceived with utmost respect. It is therefore that we must preserve this perception for our products as well, by continuously monitoring the quality, reliability and ruggedness of every step in the manufacturing process. Our design engineering criterions enhance our processes, and the exceptional choice of components that we are making, from the purchasing stage through manufacturing and delivery, is assuring maximum performance when the product reaches the customers' site. From our marine products point of view, we have delivered Multi-Mega Watt soft starters which have completely changed the way the marine market is propelled today. The certifications we have obtained are from some of the more stringent bodies in the industrial and marine market segments, and are genuine to our quality management, standards of product manufacturing.

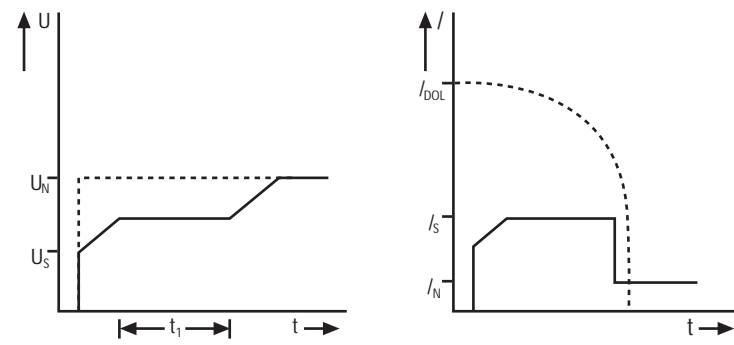


Vision

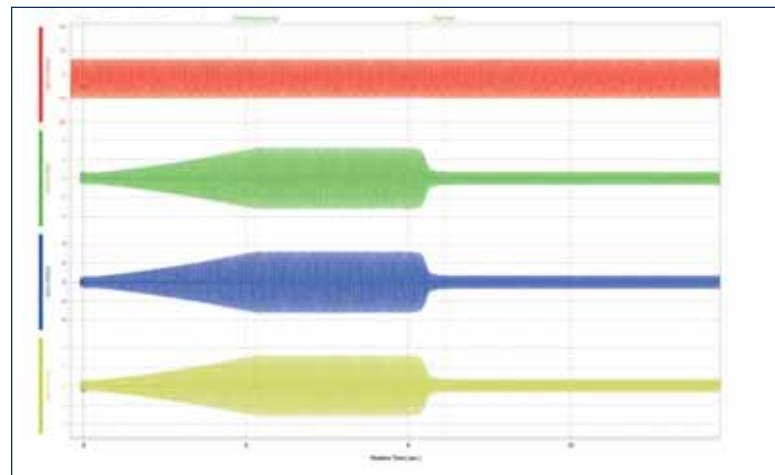
EXPANSION DUE TO INNOVATION – this is the slogan which describes best the first 10 years of Igel Elektronik. Starting with a basic range of soft starters in the year of foundation 2001, Igel Elektronik has extended this niche continuously and completed with an entire range of products and services. With growing development experience, the products have become more complex. In our development department the slogan "Copy and Paste" is absolutely forbidden. Each development starts with a blank sheet of paper. This was the basis for development of the first fully withdrawable medium voltage switchgear MV-CS. During Hanover fair 2011 Igel Elektronik will present a medium voltage soft starter in 19 inch plug-in technology. This soft starter provides full MCC functionality and the smallest dimensions in the market. For 2013 it is planned to launch a new product category. The "Full Torque @ Nominal Current" soft starter conquers existing technological limits.

CURRENT LIMIT

The voltage increases linearly from the "Initial Voltage" pre selected point. If the adjusted "Current Limit" is reached, the voltage will stop ramping and remain at its level until the current is reduced below the adjusted "Current Limit" level. In that case ramp up time is prolonged until the current has reduced below "Current Limit" level.



When a motor starts with current limit, although the current is limited the motor provides suitable torque to accelerate the driven load and reach "End of acceleration". If the motor torque does not exceed the load torque the motor will not start. In these rare cases severe damages might occur to the motor and starter.



Motor start measured with an oscilloscope (Ch1, voltage; Ch2-4 current L1 - L3)

The oscillogram shows, that the soft starter provides a smooth and stepless current and voltage ramp to the motor. Starting with the initial voltage which defines the starting current, the voltage ramps up until "Current Limit" is reached. After the motor is at speed, the current will decrease, to the nominal motor current. The oscillogram shows a clear increasing voltage and current signal, thus, no spikes stressing the grid are present.

ANALOGUE

- The analogue product line provides simple potentiometer settings for all the parameters:
- Familiar setting, similar to standard overload relays
 - Easy commissioning
 - Prior knowledge is not necessary
 - Status display via LEDs
 - ISA-A and ISA-A2P include motor protection functions

COMMUNICATION RS 485

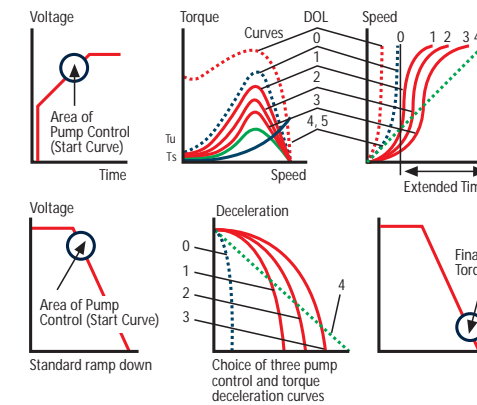
- RS 485 with MODBUS or PROFIBUS protocol enable:
- Remote (start, stop, etc.)
 - Monitoring (motor current, faults, statistical data)
 - Remote parameter setting
 - Remote reset

PUMP CONTROL

Our digital Soft Starters line of products ISA-D, ISA-DS and ISA-HD provide an advanced microprocessor based control algorithm, enabling the sophisticated pump control feature. The motor torque is continuously monitored to eliminate peak torque from stressing the motor, pump and pipe system. These soft starters provide 3 field selectable pump control algorithms.

Pump and special load control

Two major problems are associated with starting and stopping of pumps.



Over-pressure during starting

The sharp increase of torque towards the end of acceleration can cause high pressure and damage the pipe system. The pump control enables selection between three voltage ramp-up curves as well as torque curve to reduce peak torque. Current ramp is available for special loads.

Water hammer during stopping

During soft stop, when voltage is decreasing, motor torque may fall below load torque causing abrupt stalling instead of smoothly decreasing speed to zero. This creates the "water hammer" phenomenon (resulting in a loud noise and damage to the pipe system). The pump control algorithm enables selection between three voltage ramp-down curves or torque curve preventing stall condition and eliminating water hammer.

DIGITAL

- Illuminated LCD with 2 lines of 16 characters each
- Selectable languages: English, German, French or Spanish (additional on request)
- The LCD indicates the motor current, fault descriptions and statistical data.
- The LEDs provide a quick status indication. (control voltage on, motor soft start, motor on, motor soft stop, motor stop, fault)
- Easy settings by six clearly marked keys, user-friendly software with factory default parameters.



ISA-D OPTIONS

Analogue option card

- Function 1: Thermistor-input, PTC or NTC
- Function 2: Analogue-output, based on the motor current, programmable from 0-10VDC, 4-20mA, 0-20mA or inverted

Motor insulation option card

This unique feature guarantees the availability of important plant components, such as fire-extinguishing systems, redundant systems as well as submersible pumps. The system measures the motor insulation level while the motor is not in operation. Two programmable steps are available:

- Alarm-Level, adjustable 0,2-5 MOhm
- Start inhibit, adjustable 0,2-5 MOhm, avoids motor starting if the insulation is below the critical level.

BYPASS

- The product lines ISA-B, -A, -A2P and -DS include an internal bypass.
- This reliable components bypass the power electronics after the motor is at speed.
 - In addition the starters provide an auxiliary contact, allowing signaling of a successful motor start. (Many of our competitors call these auxiliary relays "a bypass contact"!)
 - The bypass function reduces the heat dissipation and eliminates the EMC load of the system.
 - As an option, ISA-DS series can be designed for DOL-start (available from ISA-DS 390).

Range 60 – 2500 A and 1500 – 15000 V



APPLICATIONS

Marine and Offshore

- Water and ballast pumps
- Refrigeration chillers and compressors
- Hydraulic pumps and power packs
- Thrusters
- Main propulsion motors
- Cargo pumps
- Generator ready – auto frequency tracking

Industrial

- Pumps
- Compressors and chillers
- Fans and blowers
- Centrifuges
- Hydraulic systems
- Conveyors
- Mills, crusher, shredder

ISA-HD

Digital medium voltage soft starters



ADVANTAGES AT A GLANCE

- Heavy duty design, 50°C ambient temperature
- Comprehensive motor protection package
- IP 32 standard, IP 54 optional
- Synchronous motor starting, utilizing unique module
- Innovative low voltage test mode – full testing with a small low voltage motor using standard built-in features
- Advanced electronic potential transformer utilizing patent pending “wireless” voltage measurement system
- Unique, patent pending fiber-optic firing system providing complete isolation between MV and LV compartments
- Each starter is tested for partial discharge (Korona) improving safety and ensuring long term reliability
- Wide 45Hz–65Hz auto-tracking frequency range combining special software with unique hardware arrangement (design for marine, offshore and generators operating under continuous frequency variation)

SWITCHGEAR OPTIONS

- Line vacuum contactor
- Bypass vacuum contactor
- Control voltage: 110V–220V AC, 110V DC
- Special thick paint
- Multi cable transit (MCT)
- Fan system – increased cooling
- Tin plated busbars
- Halogen free and fire retardant materials
- Main switch (on-load or off-load)
- Main fuses (with striker-pin indication)
- Motor Protection Relay (MSR-HD)
- C/T's and P/T's
- Digital Power Meter (DMA)
- Low voltage control devices (selector switch, push button, indication lights etc.)
- IP 32 to IP 65
- Segregated customer terminal section with cabinet light
- IEC internal arc test up to 31,5 kA
- IEC short circuit test up to 31,5 kA

STARTING AND STOPPING

- Soft start and soft stop
- Current limit
- Pump control characteristics
- Torque and current control for optimized starting and stopping
- Dual adjust
- Pulse start (kick start)
- Tacho feedback (option)

MOTOR- /SOFT STARTER PROTECTION

- Too many starts
- Long start time
- Elektronic shear-pin (start, run, jam)
- Motor overload (adjustable tripping characteristic)
- Short circuit protection
- Under current
- Unbalanced current
- Ground fault current
- Phase sequence
- Phase loss
- Under/over frequency
- Under/over voltage
- External faults (two separate inputs)
- Shorted SCR
- Wrong Connection
- Starter over temperature
- Power on without start signal
- Open bypass contactor

CONTROL

- Multi-function programmable I/O's
- Opto-isolated control inputs
- Three change over output relays, 8A/250V AC:
 - “Immediate” upon start,
 - “end of acceleration”,
 - “fault” programalbe as trip or trip-fail safe
- Analogue output 0/4–20 mA, 0–10V DC
- RS 485 communication card with modbus/profibus protocol
- Touchscreen panel (optional)
- Internal SPS for enhanced data recording

System Voltage V	Current A	Motor		Dimensions (mm)			Weight kg
		kW	HP	W	H	D	
2300	60–1600	200–5400	270–7200	900	2300	1000–1100	500–1200
3300	60–1600	280–7700	370–10300	900	2300	1000–1100	550–1250
4160	60–1600	360–9200	480–13000	900	2300	1000–1200	550–1300
6000	70–1600	610–14000	820–18500	1100–1500	2300	1100–1500	850–1350
6600	70–1600	670–15500	900–20500	1100–1500	2300	1100–1500	850–1350
10000	70–1600	1020–23000	1370–30500	2400–3500	2300	1200–1400	2100–2800
11000	70–1600	1120–25500	1510–34000	2400–3500	2300	1200–1400	2100–2800
13600	70–1600	1410–31500	1900–42000	2800–4200	2300	1200–1400	2800–3100
15000	70–1600	1530–35000	2060–46500	2800–4200	2300	1200–1400	3150–4200

APPROVALS



Medium voltage MCC formation with VCB incomer and VFD



Medium voltage MCC formation with load make fault break switches



Range 8 – 3500 A and 200 – 1000 V



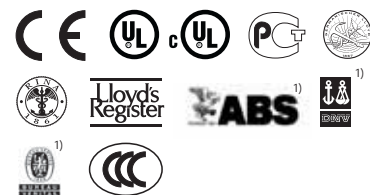
ISA-D

Digital soft starters in heavy duty design



Starter Type A	kW at 400A	Dimensions (mm)			Weight kg
		W	H	D	
ISA-D 8	4	153	310	170	4,5
ISA-D 17	7,5	153	310	170	4,5
ISA-D 31	15	153	310	217	6,8
ISA-D 44	22	153	310	217	7,5
ISA-D 58	30	153	310	217	7,5
ISA-D 72	37	153	310	217	7,5
ISA-D 85	45	274	385	279	15
ISA-D 105	55	274	385	279	15
ISA-D 145	75	274	385	279	15
ISA-D 170	90	274	385	279	15
ISA-D 210	110	590	500	292	31
ISA-D 310	160	590	500	292	31
ISA-D 390	200	590	500	292	31
ISA-D 460	250	623	660	290	65
ISA-D 580	315	623	660	290	65
ISA-D 820	450	623	660	290	65
ISA-D 950	525	623	660	290	65
ISA-D 1100	630	723	1100	370	170
ISA-D 1400	800	723	1100	370	170
ISA-D 1800	950	723	1100	370	170
ISA-D 2150	1250	750	1300	392	235
ISA-D 2400	1350	900	1300	360	350
ISA-D 2700	1750	900	1300	360	350
ISA-D 3000	1850	900	1500	360	350
ISA-D 3500	2000	900	1500	360	350

APPROVALS



ADVANTAGES AT A GLANCE

- Superior starting and stopping characteristics
- Comprehensive motor protection package
- Easy commissioning
- Complete line 8–3500A, 220–1000V
- Heavy duty design
- Robust construction
- Standard ambient temperature: 50°C
- Unique optional features including:
 - Motor insulation tester
 - RS 485 Modbus/Profibus
 - Thermistor input/analogue output

DISPLAYS LED'S

- LCD – 2 lines of 16 characters each
- Selectable languages – english, german, french and spanish
- 8 LEDs for quick indication status
- Two display modes for basic and advanced applications
- Friendly operation with default parameters
- Statistic data including: total run time, total number of starts, total number of trips, last start-current, last start time, last trip, current at trip

RELAY OUTPUT

- 3 programmable change-overcontacts:
 - Operation with adjustable on- and off delay
 - End of acceleration- with adjustable time delay
 - Fault, programmable as fail save connection
 - Motor-isolation alarm

STARTING AND STOPPING

- Soft start and soft stop
- Current limit
- Pump control program
- Torque and Current Control for optimized starting and stopping process
- Dual adjustments – two starting and stopping characteristics
- Pulse start
- Slow speed with electronic reversing
- Linear acceleration (tacho feedback)
- Energy save for improved power factor

OPTIONS

- RS 485 Communication
- Analogue output
- Thermistor input
- Motor insulation test
- Preparation for bypass – to maintain protection when bypass is closed
- Special anti-corrosive treatment – special coating for harsh environments
- Illuminated LCD
- Special tacho feedback
- Remote display

MOTOR AND STARTER PROTECTION

- Compare to ISA-DS (p.13)!

¹⁾ case by case

Range 8 – 1100 A and 200 – 690 V



ISA-DS

Digital soft starter with a built-in bypass



Starter Type A	kW at 400A	Dimensions (mm)			Weight kg
		W	H	D	
ISA-DS 8	4	120	232	122	3,1
ISA-DS 17	7,5	120	232	122	3,1
ISA-DS 31	15	120	232	122	3,1
ISA-DS 44	22	120	232	122	3,1
ISA-DS 58	30	129	275	182	5,3
ISA-DS 72	37	129	275	182	5,3
ISA-DS 85	45	129	380	182	8,6
ISA-DS 105	55	129	380	182	8,6
ISA-DS 145	75	172	380	192	11,7
ISA-DS 170	90	172	380	192	11,7
ISA-DS 210	110	380	455	295	30,2
ISA-DS 310	160	380	455	295	30,2
ISA-DS 390	200	350	550	310	31
ISA-DS 460	250	460	600	318	65
ISA-DS 580	315	460	643	318	65
ISA-DS 650	350	460	643	318	65
ISA-DS 820	450	460	643	318	65
ISA-DS 950	525	560	833	334	170
ISA-DS 1100	630	560	833	334	170

APPROVAL



ADVANTAGES AT A GLANCE

- Superior starting and stopping characteristics
- Comprehensive motor protection package
- Easy commissioning
- Fully equipped starters
- Small foot print
- Third generation microprocessor based design
- Built-in bypass
- RS 485 Communication
- Frequency autotracking: 45–65 Hz
- Unique optional features including: Analogue output and additional enhancements

DISPLAYS LED'S

- LCD – 2 lines of 16 characters each
- Selectable languages – english, german, french and spanish
- 4 LEDs – On, Run, Ramp up/down and fault
- Statistical data: start, stop and fault parameters
- Full script parameter settings

CONTROL

- Opto isolated inputs
- Auxiliary relays: fault, end of acceleration or immediate (programmable)
- Local and remote reset
- RS 485 Modbus Communications for full control, display and programming
- Future enhancements: analogue I/O card with thermistor input

STARTING AND STOPPING

- Soft start and soft stop
- Current limit
- Pump control program
- Torque and Current Control for optimized starting and stopping process
- Dual adjustments – two starting and stopping characteristics
- Pulse start
- Slow speed with electronic reversing

OPTIONS

- RS 485 Communication
- Analogue output
- Thermistor input
- Special anti-corrosive treatment – special coating for harsh environments
- Remote display

MOTOR AND STARTER PROTECTION

- Too many starts
- Shear Pin (start, run, jam)
- Electronic overload with selectable curves
- Under current
- Phase loss and phase sequence
- Under, over and no voltage
- Load loss (motor not connected)
- Thyristor bypass
- Starter over-temperature
- External fault (input programmable)
- Thyristor protection by varistors



ISA-OEM

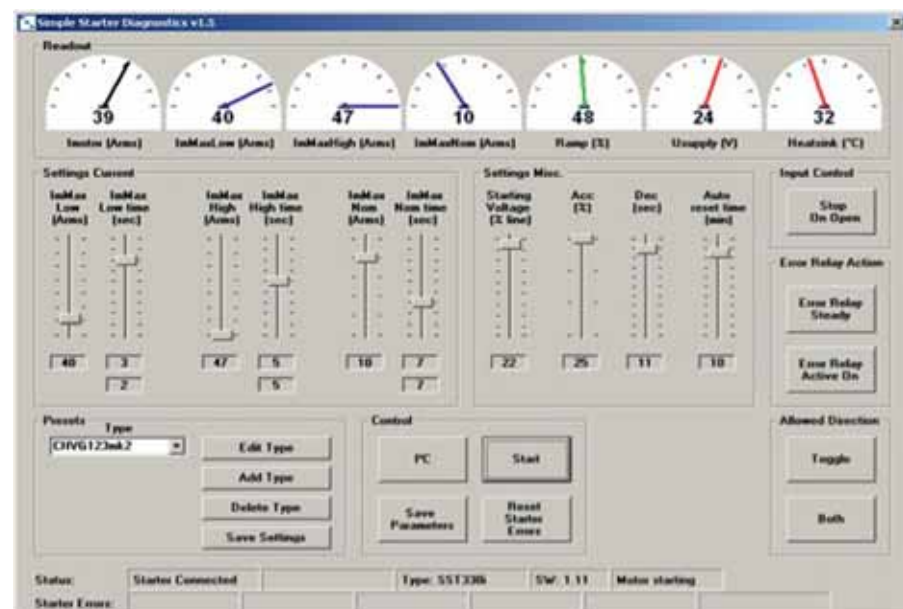
Customized soft starter with VDE approval



The product series ISA-OEM has been developed especially for serial applications in order to be implemented into customers' devices. The devices shown here represent only a small selection of customized soft starters produced by Igel Elektronik. As the name implies, all products of the ISA-OEM series are developed upon customers' specification.

Starter Type	Voltage	Current (A)	Dimensions (mm)			Weight (kg)
			W	H	D	
ISA-OEM 130i	230V/1P	30	115	50	205	0,6
ISA-OEM 330i	400V/3P	30	115	50	205	0,6
ISA-OEM 360i	400V/3P	60	155	55	245	0,9

USB-PARAMETERIZING SOFTWARE



ADVANTAGES AT A GLANCE

- VDE approval for domestic appliances
- Ideal matching to the application
- µC operated start-/ stop ramps
- Very good price-performance-ratio
- Bypass contacts integrated
- Motor- / Mains protection integrated
- Software for programming via USB (Plug and Play Function!)
- For 1 and 3 phase application
- Mains frequency 42 – 70Hz Auto trigger

MOTOR AND STARTER PROTECTION

- Electronic overload
- Phase loss
- Phase sequence
- Under voltage
- Over voltage
- Fault History
- Too many starts
- Motor stall
- Over temperature

STARTING AND STOPPING

- Soft Start (Multiple Ramp)
- Soft Stop
- Current limit
- Auto start function

APPROVALS



ISA-DS EX

Digital soft starter with approval for Ex-E Motors



Starter Type A	kW at 400 A	Dimensions (mm)			Weight kg
		W	H	D	
ISA-DS-EX 8	4	120	232	122	3,1
ISA-DS-EX 17	7,5	120	232	122	3,1
ISA-DS-EX 31	15	120	232	122	3,1
ISA-DS-EX 44	22	120	232	122	3,1
ISA-DS-EX 58	30	129	275	182	5,3
ISA-DS-EX 72	37	129	275	182	5,3
ISA-DS-EX 85	45	129	380	182	8,6
ISA-DS-EX 105	55	129	380	182	8,6
ISA-DS-EX 145	75	172	380	192	11,7
ISA-DS-EX 170	90	172	380	192	11,7
ISA-DS-EX 210	110	380	455	295	30,2
ISA-DS-EX 310	160	380	455	295	30,2
ISA-DS-EX 390	200	350	550	310	31
ISA-DS-EX 460	250	460	600	318	65
ISA-DS-EX 580	315	460	643	318	65
ISA-DS-EX 650	350	460	643	318	65
ISA-DS-EX 820	450	460	643	318	65
ISA-DS-EX 950	525	560	833	334	170
ISA-DS-EX 1100	630	560	833	334	170

APPROVALS



TEST PERFORMED BY TÜV RHEINLAND

- 194/ Ex449.01/07

TECHNICAL DATA

- Superior starting and stopping characteristics
- Comprehensive motor protection package
- Easy commissioning
- Fully equipped starters
- Small foot print
- Third generation microprocessor based design
- Built-in bypass
- RS 485 Communication
- Frequency autotracking: 45–65 Hz
- Unique optional features including: Analogue output and additional enhancements
- Ex approvals and certifications

DISPLAYS LED'S

- LCD – 2 lines of 16 characters each
- Selectable languages – english, german, french and spanish
- 4 LEDs – On, Run, Ramp up/down and fault
- Statistical data: start, stop and fault parameters
- Full script parameter settings

CONTROL

- Opto isolated inputs
- Auxiliary relays: fault, end of acceleration or immediate (programmable)
- Local and remote reset
- RS 485 Modbus Communications for full control, display and programming
- Future enhancements: analogue I/O card with thermistor input

STARTING AND STOPPING

- Soft start and soft stop
- Current limit
- Pump control program
- Torque and Current Control for optimized starting and stopping process
- Dual adjustments – two starting and stopping characteristics
- Pulse start
- Slow speed with electronic reversing

OPTIONS

- RS 485 Communication
- Analogue output
- Thermistor input
- Special anti-corrosive treatment – special coating for harsh environments
- Remote display

MOTOR AND STARTER PROTECTION

- Too many starts
- Shear Pin (start, run, jam)
- Electronic overload with selectable curves
- Under current
- Phase loss and phase sequence
- Under, over and no voltage
- Load loss (motor not connected)
- Thyristor bypass
- Starter over-temperature
- External fault (input programmable)
- Thyristor protection by varistors

Range 8 – 170 A and 200 – 600 V



ISA-A und ISA-A2P

Analogue soft starter with motor protection and built-in bypass



Starter-Type (A)	kW at 400 A	Dimensions (mm)			Weight (kg)
		W	H	D	
ISA-A 8	4	120	232	105	2,6
ISA-A 17	7,5	120	232	105	2,6
ISA-A 31	15	120	232	105	2,6
ISA-A 44	22	120	232	105	2,6
ISA-A 58	30	129	275	185	5
ISA-A 72	37	129	275	185	5
ISA-A 85	45	129	380	185	8,4
ISA-A 105	55	129	380	185	8,4
ISA-A 145	75	172	380	195	11,8
ISA-A 170	90	172	380	195	11,8

Starter-Type (A)	kW at 400 A	Dimensions (mm)			Weight (kg)
		W	H	D	
ISA-A2P 31	15	65	190	114	1,4
ISA-A2P 44	22	65	190	114	1,4
ISA-A2P 58	30	120	265	121	3,5
ISA-A2P 72	37	120	265	121	3,5
ISA-A2P 85	45	120	265	121	3,5
ISA-A2P 105	55	120	265	121	3,5
ISA-A2P 145	75	129	275	182	6,5
ISA-A2P 170	90	129	275	182	6,5

APPROVALS



ADVANTAGES AT A GLANCE

- Soft start and soft stop
- Current limit
- Build-in motor protection
- Build-in bypass
- Start/stop by dry contact
- Compact, small foot print
- Aluminum housing
- Integrated input voltage monitoring

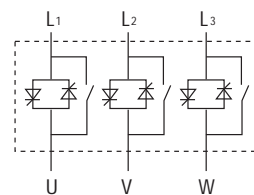
DISPLAYS LED'S

- ON – mains voltage connected
- Ramp up/down
- Run
- Overload
- Phase loss
- Over temperature

MOTOR AND STARTER PROTECTION

- Electronic overload
- Phase loss
- Starter over-temperature
- SCR protection by metal oxide varistors

3-PHASE-CONTROL ISA-A



APPLICATIONS

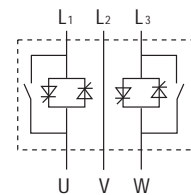
- Pumps
- Compressors
- Fans
- Blowers
- Conveyors
- Starting from weak power supplies (diesel generators etc.)



AUXILIARY RELAYS

- End of acceleration relay, N.O contact
- Fault relay, N.O contact
- Over temperature

3-PHASE-CONTROL ISA-A2P



Range 8 – 58 A and 200 – 600 V



ISA-B und ISA-B2P

Basic soft starter with built-in bypass



Starter-Type (A)	kW at 400 A	Dimensions (mm)			Weight (kg)
		W	H	D	
ISA-B 8	4	65	190	114	1,2
ISA-B 17	7,5	65	190	114	1,2
ISA-B 31	15	120	207	105	2,1
ISA-B 44	22	120	207	105	2,1
ISA-B 58	30	120	207	105	2,1

Starter-Type (A)	kW at 400 A	Dimensions (mm)			Weight (kg)
		W	H	D	
ISA-B2P 8	4	45	75	105	0,5
ISA-B2P 17	7,5	90	75	105	0,6
ISA-B2P 22	11	90	75	105	0,6
ISA-B2P 31	15	65	190	114	1,3
ISA-B2P 44	22	65	190	114	1,3
ISA-B2P 58	30	65	190	114	1,3

APPROVALS



ADVANTAGES AT A GLANCE

- Soft start and soft stop
- Build-in bypass
- Start/stop by dry contact
- End of acceleration relay, N.O contact
- Compact, small foot print
- DIN rail mounting (partly option)

DISPLAYS LED'S

- ON – mains voltage connected
- Ramp – voltage is ramping up/down (only ISA-B2P)
- Run – motor is running (only ISA-B2P)

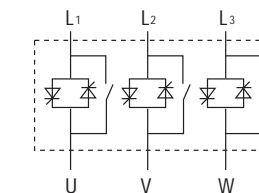
MOTOR AND STARTER PROTECTION

- SCR protection by metal oxide varistors

OUTPUT RELAYS

- End of acceleration

3-PHASE-CONTROL ISA-B

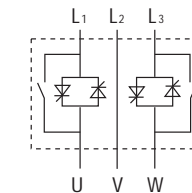


APPLICATIONS

- Pumps
- Compressors
- Fans
- Conveyors
- Light duty motors in industrial applications
- Small conveyors (supermarkets etc.)
- Electrically driven gates
- Machine tools and appliances



3-PHASE-CONTROL ISA-B2P



Range 8 – 390 A and 230 – 600 V



IMB

DC injection brake



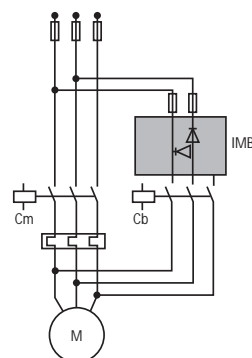
Brake Type (A)	kW at 400 A	Dimensions (mm)			Weight (kg)
		W	H	D	
IMB 10	5*	90	75	105	0,5
IMB 17	7,5	65	190	114	1,3
IMB 31	15	65	190	114	1,3
IMB 58	30	65	190	114	1,3
IMB 105	55	154	280	160	5
IMB 210	110	154	280	160	5,4
IMB 310	160	224	384	222	12
IMB 390	200	224	384	222	12

* 5,5kW at 415V

APPROVALS



TECHNOLOGY



ADVANTAGES AT A GLANCE

The IMB electronic motor brake provides fast, smooth and frictionless stopping of a three phase induction motor, by injecting controlled DC current to the motor windings, after the mains contactor opened.

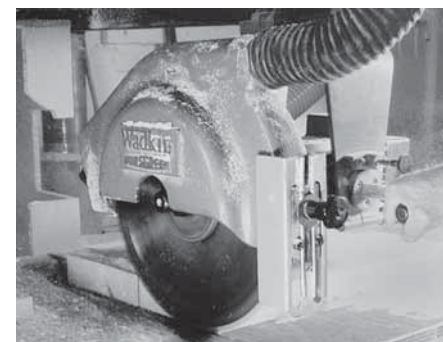
- Preventing mechanical wear
- Reducing stopping time of high inertia loads
- Adjustable braking time
- Auto stop – DC injection stops when motor stops
- DIN rail mounting (Standard 10A, option 17–58A)
- Easy installation and operation

SETTINGS

- Braking Torque – determines the DC current level injected to the motor windings
- Two operation modes:
 1. Auto Mode: DC injection stops automatically when motor stops.
 2. Manual Mode: DC injection stops after the the pre-adjusted braking time. This mode can be used to “hold” the load at stand still.

APPLICATIONS

- Circular and band saws
- Machine tools
- Fast stopping of high inertia loads
- Emergency stop (as long as mains supply remains on)



DISPLAYS LED'S

- ON – mains voltage connected
- Braking contactor closed
- DC injection on

Range 8 – 1500 A and 200 – 690 V



TSE

Thyristor power supply



TSE Type	FLC (A)	Dimensions (mm)			Weight (kg)
		W	H	D	
TSE 8	8	172	275	192	6,3
TSE 17	17	172	275	192	6,3
TSE 31	31	172	275	192	6,4
TSE 44	44	172	275	192	6,5
TSE 58	58	172	275	192	6,5
TSE 72	72	172	275	192	6,5
TSE 85	85	172	380	192	8,5
TSE 105	105	172	380	192	8,5
TSE 145	145	172	385	238	14,5
TSE 170	170	274	385	238	14,5
TSE 210	210	274	385	238	14,5
TSE 310	310	274	455	295	31
TSE 390	390	380	455	295	31
TSE 460	460	380	555	295	51
TSE 580	580	470	655	302	53
TSE 820	820	470	655	302	53
TSE 950	950				on request
TSE 1100	1100				on request
TSE 1500	1500				on request

APPROVALS



ADVANTAGES AT A GLANCE

The sophisticated digital thyristor power supply allows the stepless regulation of ohmic loads.

- Analogue setpoint input
- Complete programming and fault indication with LCD display
- Integrated protection functions
- Two control functions to minimise interferences
- Steady power output also if one heating element is faulty.
- Easy installation and easy operation

DISPLAYS LED'S

- LEDs for quick status overview
- LCD – 2 lines, 16 characters
- Parameter input and fault output in full wording

FUNCTIONS

- Digital parameter input
- Master/Slave operation
- Phase control or zero crossing (pulse)
- Programmable output relay
- Programmable set point input
- Maintenance- free operation
- Unlimited switching operations
- RS 485-interface

APPLICATIONS

- Extruder
- Pipe heating
- Lightings
- All kinds of furnaces
- Oil heating devices
- Electric heating elements

PROTECTIONS FUNCTIONS

- Under current and over current
- Phases unbalance
- Under voltage and over voltage
- Phase loss
- Ground fault
- Over power and under power limit exceeded
- External failure
- Connection control

Range 0 – 50 A and 230 – 500 V



IKS-D

Digital cathodic protection in heavy duty design



ADVANTAGES AT A GLANCE

- Small dimensions
- Current and voltage adjustments "on line"
- Measure the potential while changing the current or voltage.
- Stable and step less current and voltage regulation
- Full GSM control and feedback
- GPS synchronisation (Option)
- 12 month change event recorder
- RS-232 and 485 Communication
- Real time clock
- Reference Potential control

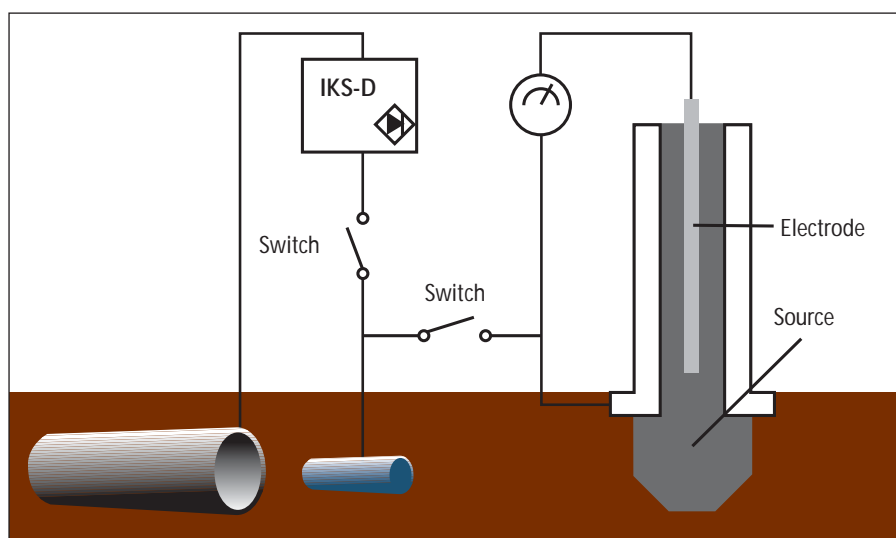
DISPLAYS LED'S

- LCD – 2 lines of 16 characters each
- Multilingual
- 3 LEDs – On, RUN and Fault
- Event Recorder
- Parameter setting and fault text in full

PROTECTIONS

- Incoming over voltage
- Outgoing over voltage
- Current limit
- Over current
- Reference potential error
- Low backup battery voltage
- Internal fault

ADVANCE REFERENCE MEASUREMENT



For the reference measurement a reference cell has to be installed in the ground. This reference cell must be of the same material and has the same potential difference as the protected object. By disconnecting switch S2 we can measure the actual potential on the reference cell in order to adapt the IKS-D to probable modifications. When using this procedure there is no need to disconnect the protected object from the potential and a constant corrosion protection is guaranteed.

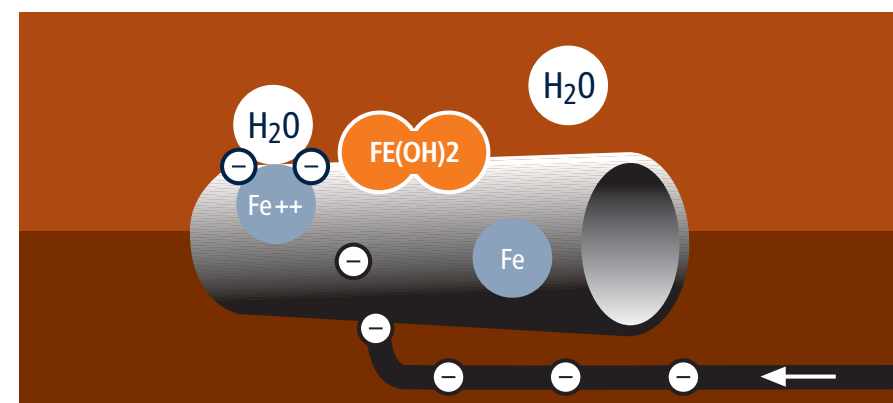
APPLICATIONS

- Vessels
- Underground pip lines
- Underground container
- Oil Platform
- Harbour areas
- Industrial areas
- Coolant processing plant

APPROVALS

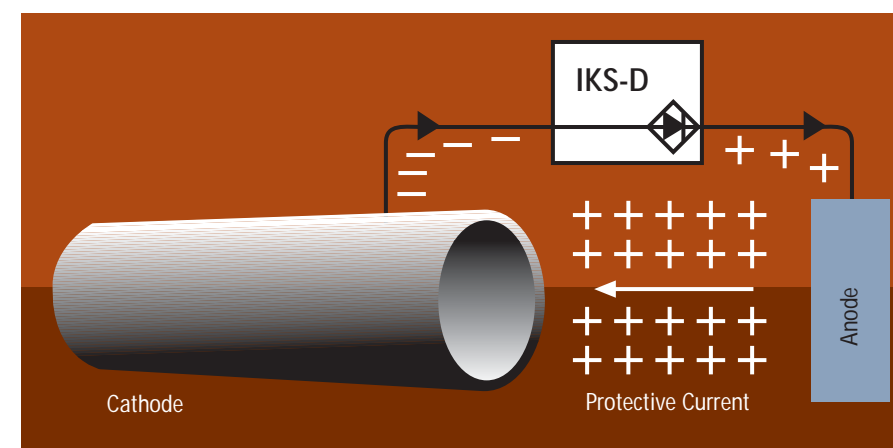


CHEMICAL REACTION



From the chemical point of view a corrosion is an ion migration. Metallic objects which are in contact to the ground are subject to potential differences so that equalizing currents are flowing. This results in a material loss which is named corrosion. Without any ion migration no corrosion would occur. When the potential between metal and electrolyte is in balance, oxidation will die down.

CATHODIC PROTECTION



Cathodic protection effectively prevents corrosion of the protected object by active intervention in the electrochemical corrosion process. The structure-to-soil potential can be measured and influenced, allowing the protected structure to be set to a defined protective potential when connecting a rectifier current source (IKS-D). The IKS-D will be built-in between pipe and anode (anipole). Then the current flows from the anode through the pipe insulation faults into the pipe wall out of steel. This will stop ion migration from the protected object and corrosion will no longer be possible.



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