



Tomorrow's Future

Leading Technology for Industrial Braking Systems

Arno Weil

www.pintschbubenzer.com



GROUP



Industrial
brakes &
couplings

Naval Defense,
Marine, Oil &
Gas



Wind turbine
Brakes

Wind



couplings,
pneumatic
clutches /
brakes, friction
materials

Industrial,
Marine, Mining,
Oil & Gas



Storm brakes &
rail brakes/rail
clamps

Ports, Mining



Industrial
brakes,
couplings,
thruster

Ports, Steel,
Mining,
Offshore



100
%



100
%



Administration and Production Buildings



R & D Center



PINTSCH BUBENZER:

- Drum brakes
- Emergency brakes
- Motor mounted brakes
- Couplings

RIMA:

- Storm brakes
- Rail brakes
- Wheel brakes
- Hydraulic Systems

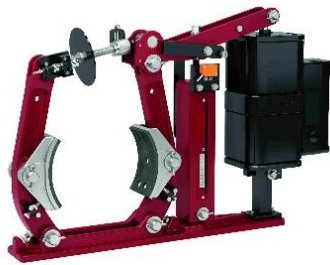


Product Range

Disc Brakes



Drum Brakes



Motor Mounted Brakes



Accessories



Wheel Brakes



Band Brakes



Storm Brakes



Monitoring Systems



Thrusters



Rotary Actuators



COBRA®

Hydraulic Systems

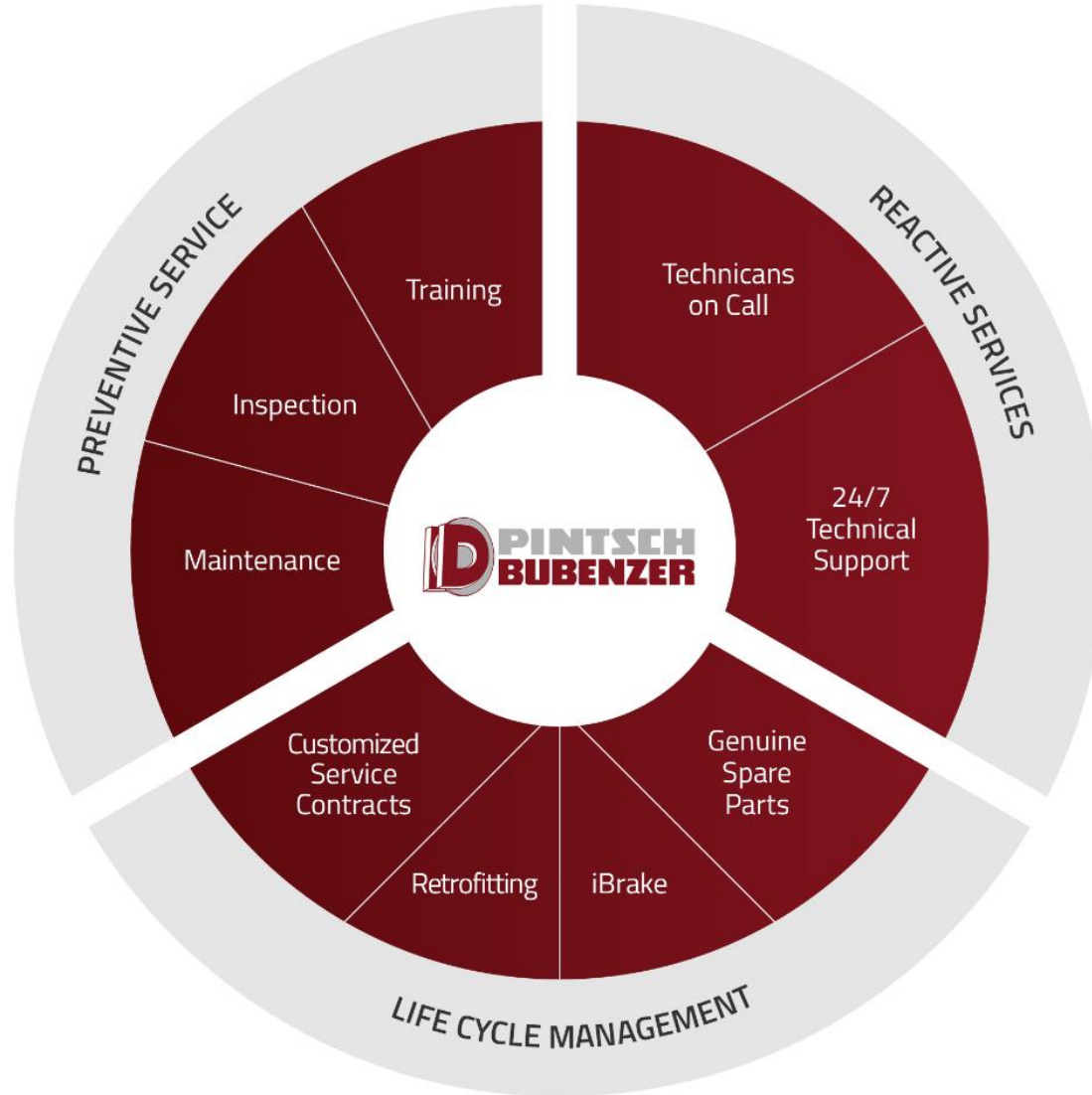


Worldwide Representatives/ Subsidiary Companies



● PINTSCH BUBENZER incl. subsidiary companies

● Representatives



Test Center with Dyno-Stands



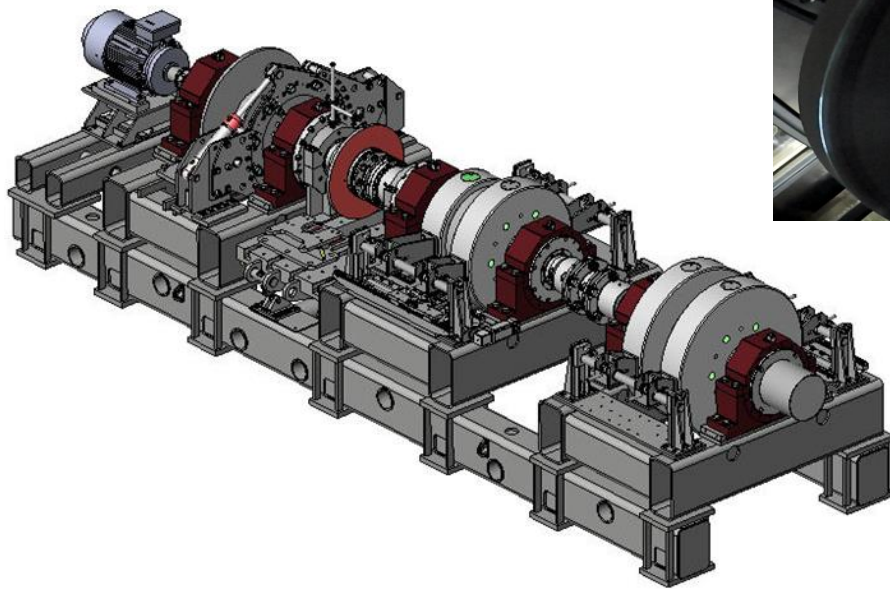
Dyno Stand



Frog Test Bench



Climate Chamber



PINTSCH BUBENZER

- ➡ Worldwide best products
- ➡ State of the art R&D center
- ➡ Customer focused
- ➡ 24/7 Service on best level
- ➡ Provides you the leading technology for the future

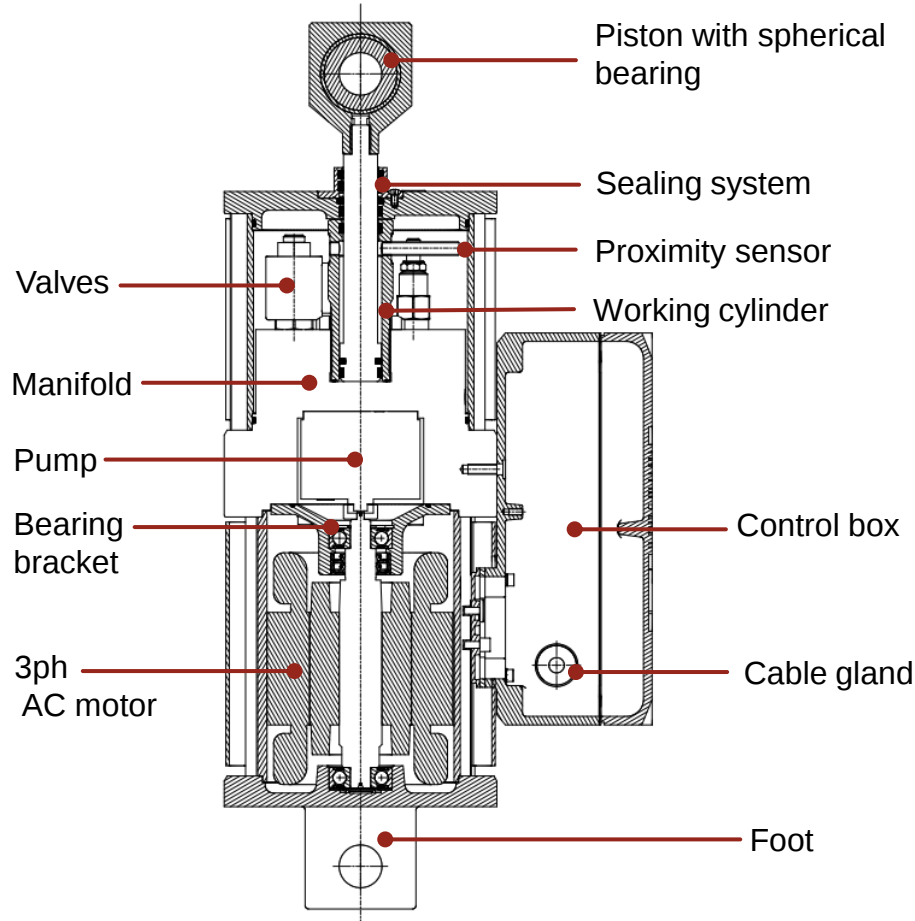
PINTSCH **BUBENZER** **E**LECTRO-HYDRAULIC Thrusters
BUEL® Family



BUEL® Model H



- Pressure built-up with high hydraulic-mechanical efficiency
- Fail safe principle
- Automatic compensation of pressure losses
- Wide service temperature range in the standard version
- Compact dimensions
- Extreme fast setting times
- High actuating forces
- Energy savings by intermittent operation
- Compensation of shear forces and alignment errors by use of swivel head
- Low internal heat build-up
- Reduced filling volume
- Low weight
- Good weight/ performance ratio



Working Principle: Positive Displacement Pump

- Forces: 230 N up to **10000 N**
- Compact design (patented shape)
- High hydraulic / mechanical efficiency
- **Low energy consumption**
- Internal gear pump for pressure generation (patented)
- Variable actuation force
- **Faster closing speed**

BUEL® Thruster



0 ms

Conventional Thruster



0 ms

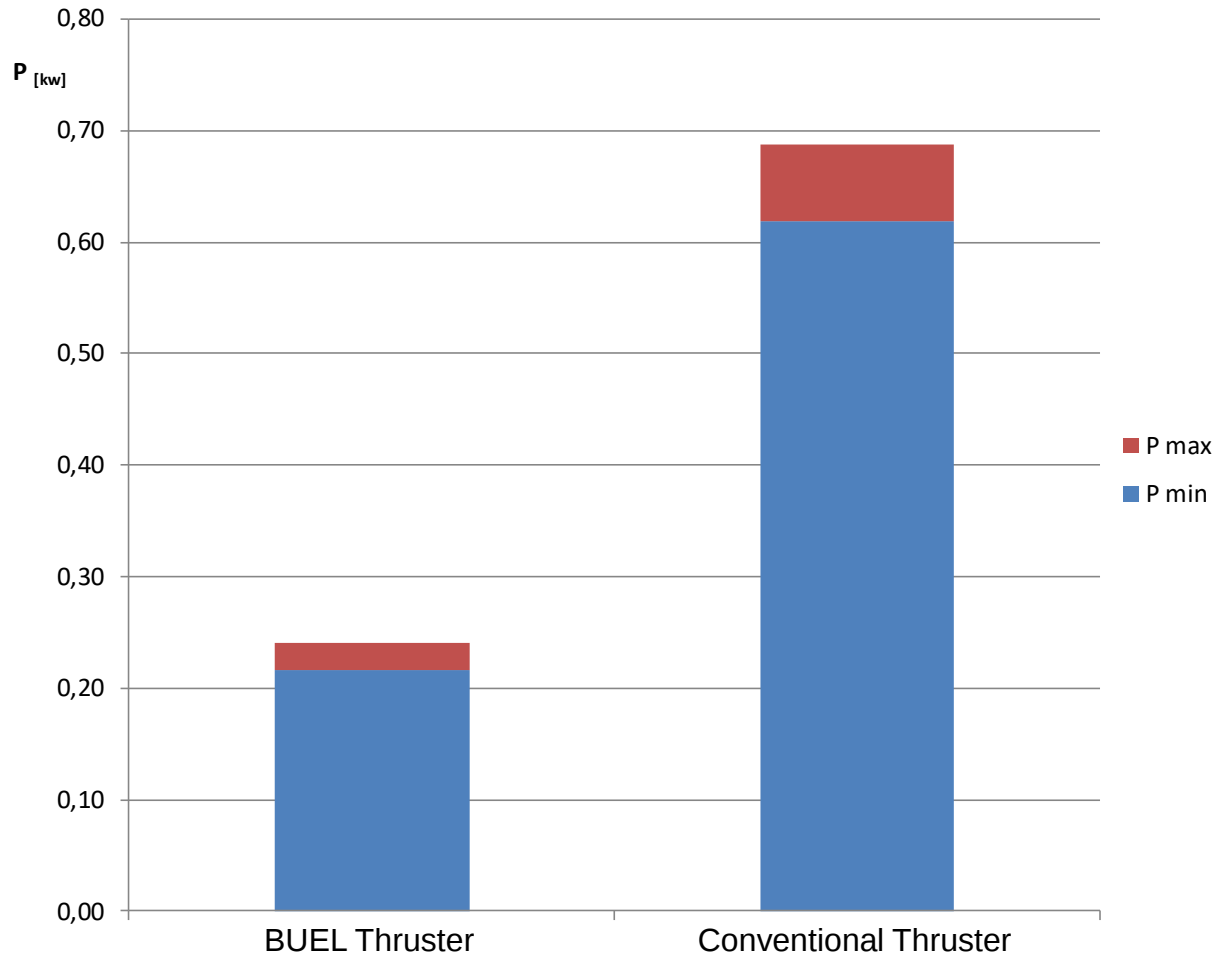
BUEL® Model H - Technical Data



BL	Max. Force	Max. Power	Max. Current	Weight
22-5	400 N	0,15 kW	0,4 A	11 kg
30-5	450 N	0,16 kW	0,4 A	13 kg
35-5	600 N	0,35 kW	0,6 A	16 kg
50-6	900 N	0,45 kW	0,7 A	16 kg
50-12	900 N	0,45 kW	0,7 A	16 kg
80-6	2000 N	0,6 kW	1,3 A	21 kg
80-12	2000 N	0,6 kW	1,3 A	21 kg
125-6	2500 N	0,65 kW	1,4 A	24 kg
125-12	2500 N	0,65 kW	1,4 A	24 kg
200-6	3600 N	0,8 kW	1,5 A	24 kg
200-12	3600 N	0,8 kW	1,5 A	24 kg
300-6	5000 N	0,9 kW	1,6 A	33 kg
300-12	5000 N	0,9 kW	1,6 A	33 kg
400-8	5500 N	1,0 kW	1,7 A	33 kg
400-10	5500 N	1,0 kW	1,7 A	33 kg
440-8	6500 N	1,1 kW	1,8 A	33 kg
450-8	7000 N	1,2 kW	2,0 A	33 kg
550-8	8000 N	1,25 kW	2,1 A	33 kg
600-8	8000 N	1,25 kW	2,1 A	33 kg

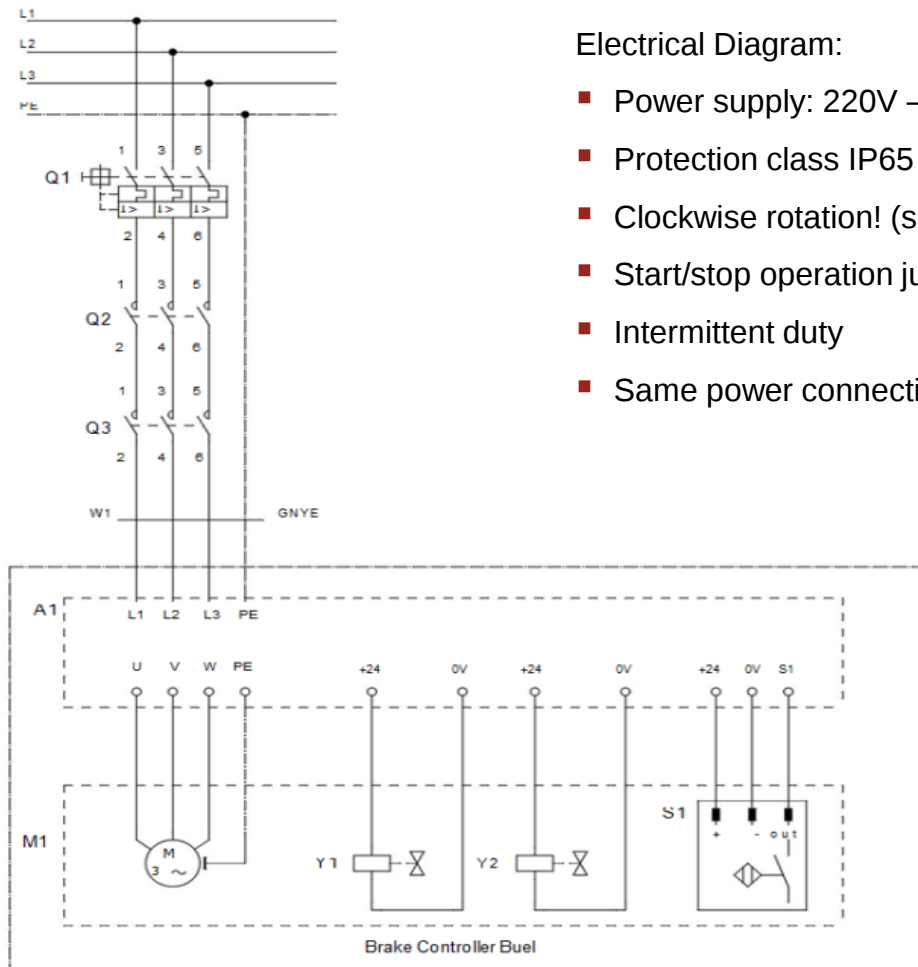
Temperature range -30°C - +50°C

BUEL® PINTSCH BUBENZER ELECTRO-HYDRAULIC thruster



Power consumption approx.
60% lower than
Conventional Thruster

BUEL® Model H - Some more Features



Electrical Diagram:

- Power supply: 220V – 690V, 50 or 60Hz
- Protection class IP65 (like Conventional Thruster)
- Clockwise rotation! (see terminal assignment)
- Start/stop operation just by energizing/de-energizing
- Intermittent duty
- Same power connection like Conventional type thruster

BUEL® Model H – Fact Sheet



BUEL® Thruster	Conventional Thruster	SCORE BUEL® vs. Conv. Thruster
Max. pressure: 110 bar	Max. pressure: 2 bar	1:0
Oil volume: 0.55 l (big size)	Oil volume: 10,6 l (big size)	2:0
Max. lifting force: 8000 N	Max. lifting force: 6300 N	3:0
Closing/Setting time: 150ms (big size)	Closing/Setting time: 300ms (big size)	4:0
Weight: 33 kg (big size)	Weight: 43,5 kg (big size)	5:0
Power consumption: Low	Power consumption: High	6:0
UL® certificate: Yes	UL® certificate: No	7:0
Rated for highly dynamic applications	Only restrictedly suitable for dynamic applications	8:0
Multi-frequency electric motor (same motor for 50 and 60 Hz)	Motor with 50 or 60 Hz	9:0
Weight-Power-Ratio: 242 N/kg	Weight-Power-Ratio: 150 N/kg and less for new developments...	10:0

Solution: BUEL® Model G





- Pressure built-up with high hydraulic-mechanical efficiency
- Fail-safe principle
- Automatic compensation of pressure losses
- Wide service temperature range in the standard version
- Compact dimensions
- Extreme fast setting times
- High actuating forces
- Energy savings by intermittent operation
- Low internal heat build-up
- Reduced filling volume
- Low weight
- Good weight/ performance ratio

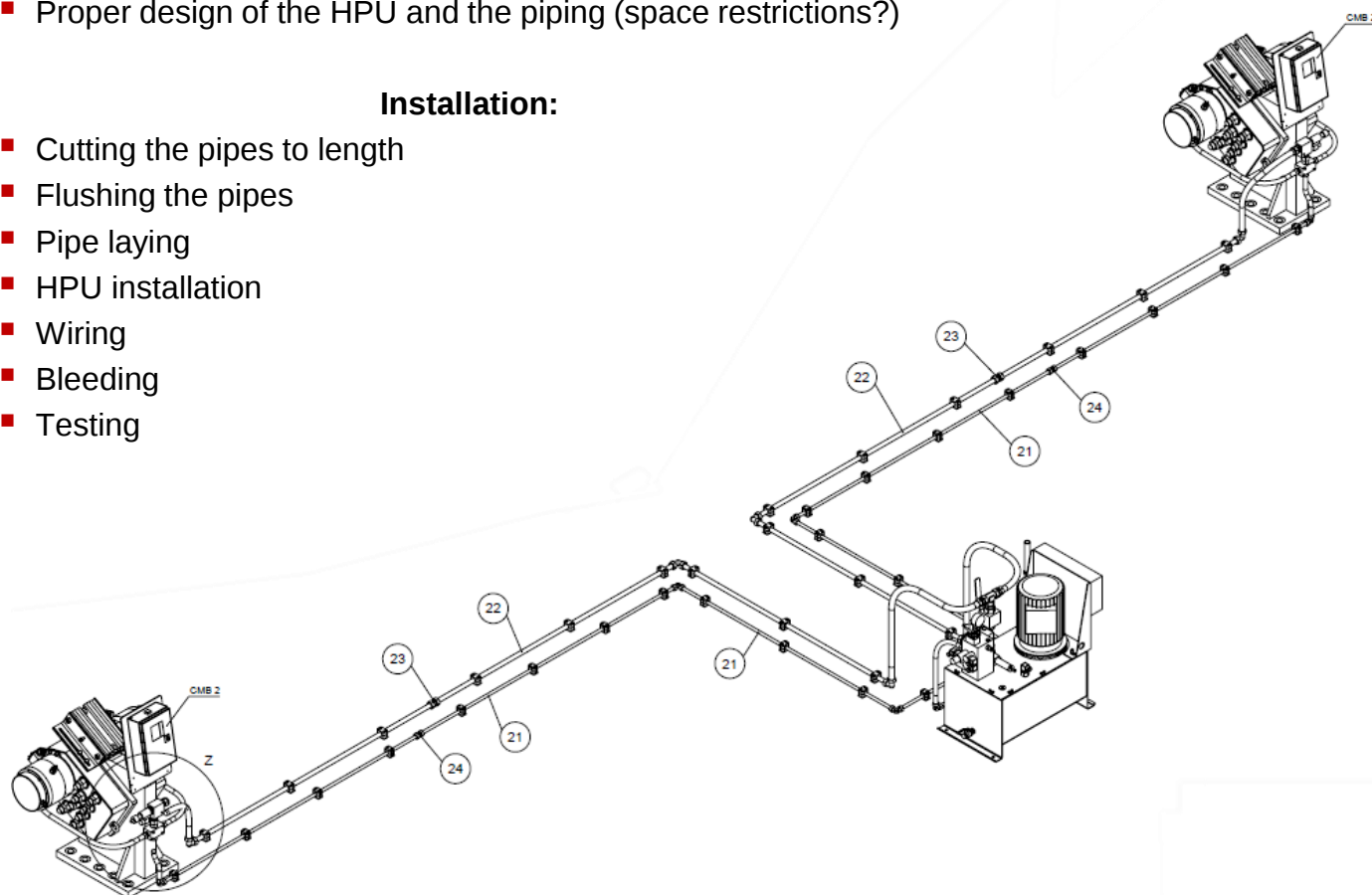
Typical Hoist Design for Emergency Brakes Set of Emergency Brakes with Hydraulic Power Unit

Before the installation:

- Proper design of the HPU and the piping (space restrictions?)

Installation:

- Cutting the pipes to length
- Flushing the pipes
- Pipe laying
- HPU installation
- Wiring
- Bleeding
- Testing

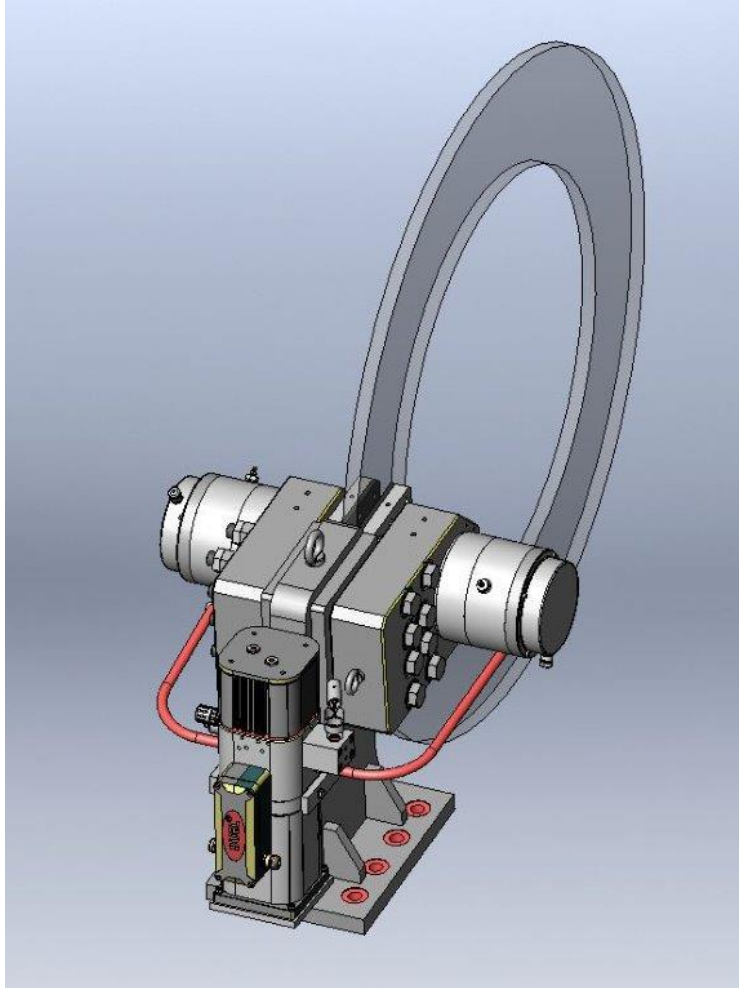


Problems:

- Oil pollution due to improper or missing flushing process
- Loose screw fittings
- Leakages on new(!) installations
- Huge effort for cleaning and repairing pipes and brakes
- Delayed commissioning process
- Oil change required every 12 months
- Huge effort for maintenance

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Hoist Design for Emergency Brakes with BUEL® Model G



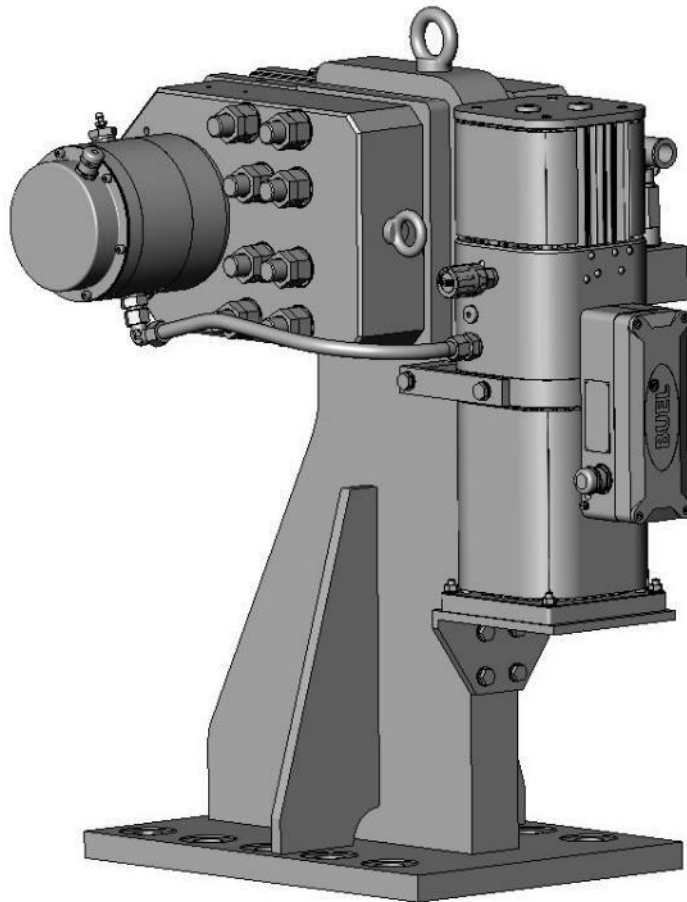
- High performance power pack for hydraulic (safety) brakes

Delivery state:

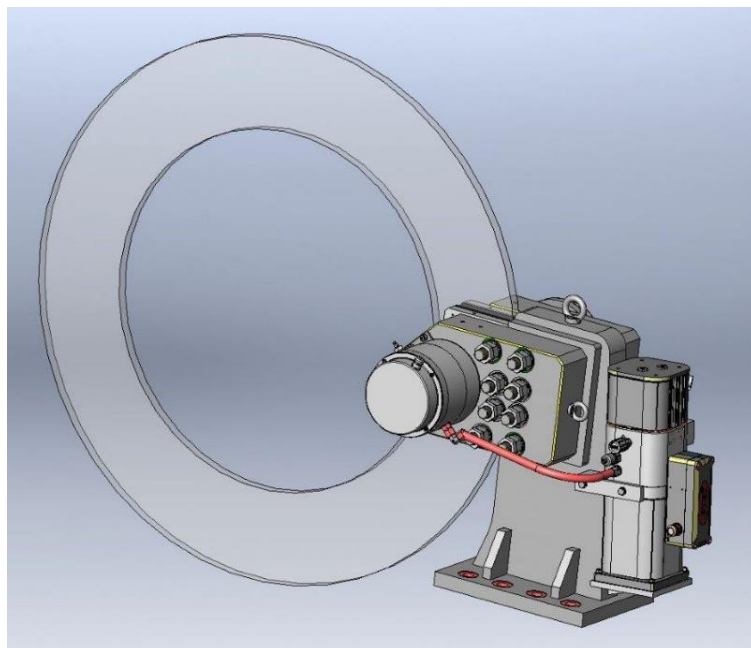
- Completely mounted on a bracket, piped – ready for use



Hoist Design for Emergency Brakes with BUEL® Model G



- Environmentally friendly (use of bio-degradable oil)
- Energy saving by limited duty cycle
- Hydraulic components protected inside the housing
- Hand pump
- 3 phase power supply only (internal generation of control voltage for valves and sensors)

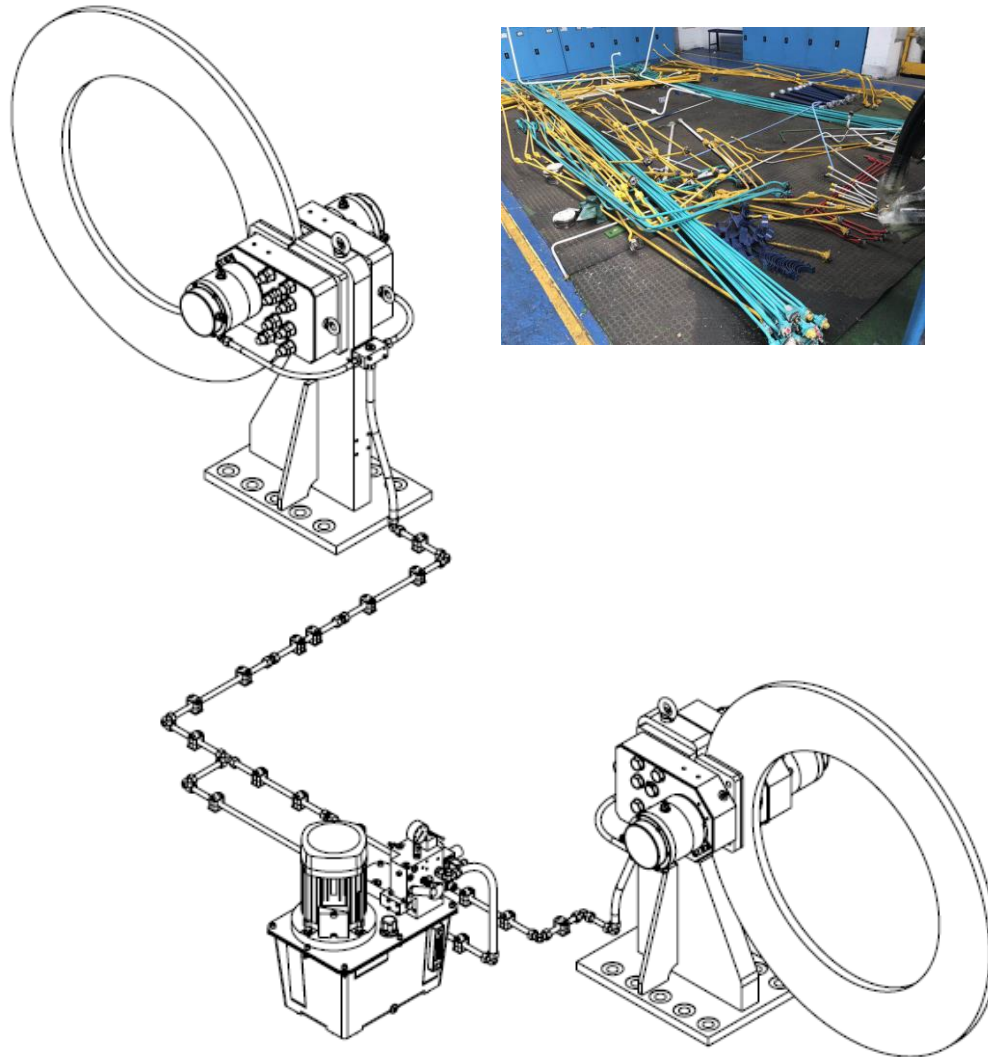


Quantity of brakes on one pedestal (1 brake = 2 flanges)	Type	Type	Setting time
	SF	GPPBL	approx. [s]
1 brake	SF 10	GPPBL 210	0,08
2 brakes	SF 10		0,12
1 brake	SF 15	GPPBL 210	0,08
2 brakes	SF 15		0,12
1 brake	SF 24	GPPBL 210	0,1
2 brakes	SF 24		0,17
1 brake	SF 30	GPPBL 240	0,14
2 brakes	SF 30		0,24
1 brake	SF 40	GPPBL 240	0,14
2 brakes	SF 40		0,24
1 brake	SF 50	GPPBL 210	0,17

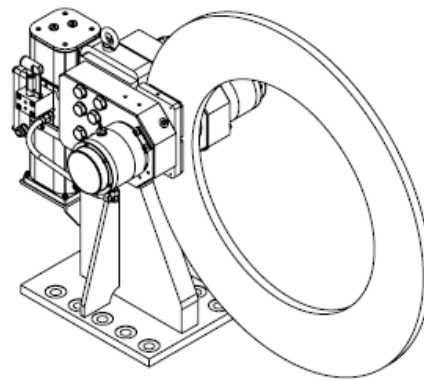
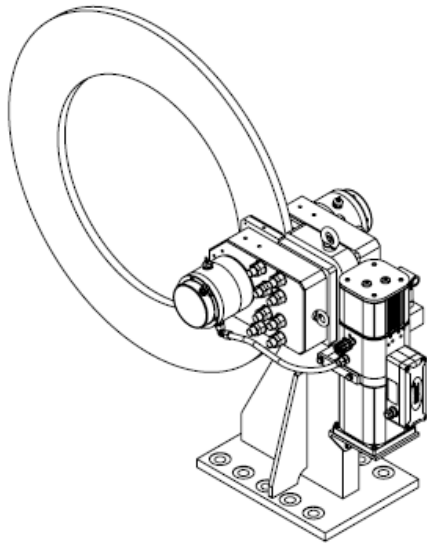
Technical data:

Type	P _{max} *	P _{el} *	I*	weight	Op. Mode	output*
	[bar]	[kW]	[A]	[kg]	S1 and S3 up to	[l/min]
GPPBL 100	100	1,7	4,4	38	200 c/h	6
GPPBL 210	210	3,2	6,0	38	200 c/h	6
GPPBL 240	240	3,8	6,5	38	200 c/h	6

BUEL® Model G – Before and ...After



BUEL® Model G – Before and ... After



Initial installation:

Classic HPU	BUEL® Model G
No standard specification	Standard specification
Pipe laying design required	
Install safety brakes (proper aligning and bolting)	BUEL® Model G Plug and Play installation (factory installed and mounted on a support, ready for immediate use)
Pipes to be cut to length	
Pipes to be flushed	
Pipe laying process (fittings to be correctly tightened)	
HPU installation	
Fill in new oil	
HPU to be wired (terminal box etc.)	BUEL® Model G connected to power supply
Bleeding	
Testing	Testing

Problems:

Classic HPU	BUEL® Model G
Oil pollution due to improper or missing flushing process	
Loose screw fittings	
Leakages on new(!) installations	
Huge effort for cleaning and repairing pipes and brakes	
Delayed commissioning process	
Oil change required every 24 months	Biodegradable oil (lifetime filling)
Huge effort for maintenance	

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Thruster Designed for Wheel Brakes BUEL® Model S

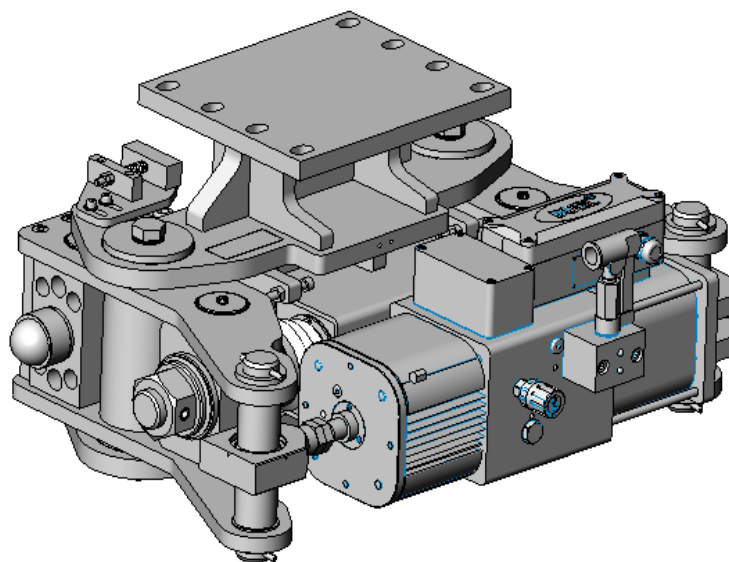


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Thruster Designed for Wheel Brakes BUEL® Model S



- Pressure generation by centrifugal gear pump
- Energy saving by intermittent duty
- Fail safe principle
- Redundant valves
- Terminal box with control board
- Automatic pressure drop compensation
- Low heat generation
- Huge temperature range in standard execution
- Little oil volume
- Little ecologic risk
- High protection category
- Infinitely variable setting time
- Hand pump with shut-off valve
- Low weight, excellent mass/performance ratio
- Limit switch release control off the shelf



- Power supply: 220V – 690V, 50 or 60Hz
- Protection class IP 65
- No limitation of the duty cycle
- Temperature range -30°C to +50°C
- High performance synthetic oil PENTOSIN CHF 11S insures trouble-free operation in the entire temperature range
- Preferable operated in horizontal position (+/- 2° deviation permitted)

Options:

- Protection Class IP 67
- Deviating ambient temperatures possible
- Use of small heater for motor protection
Voltages: 110V – 120 VAC, 50/60 Hz
220V – 240 VAC, 50/60 Hz
- Biodegradable oil

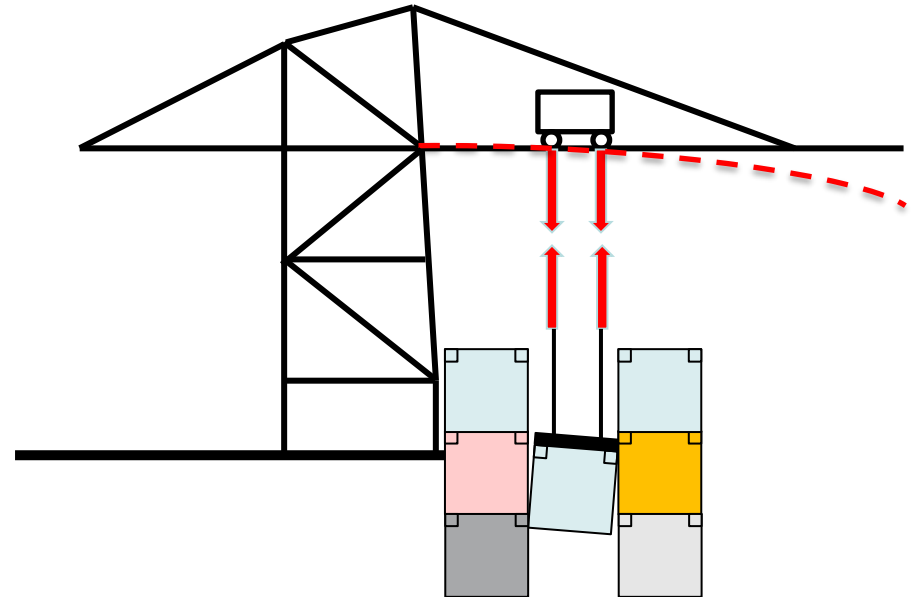
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Thruster Designed for Wheel Brakes BUEL® Model S



What is SNAG?

- A SNAG event is an overload condition!
- ...it only occurs when the crane is hoisting
- The spreader is stopped or “snagged” by an obstruction
- The hoist machinery and motor continue to rotate whereas the spreader stands still



What is SNAG?

- The rope forces increase dramatically and the boom structure is bending
- Especially at high speed lifting a sudden and extreme overload occurs

...Consequences

- Tearing ropes, broken gears, or even worse...



BUEL® Thruster

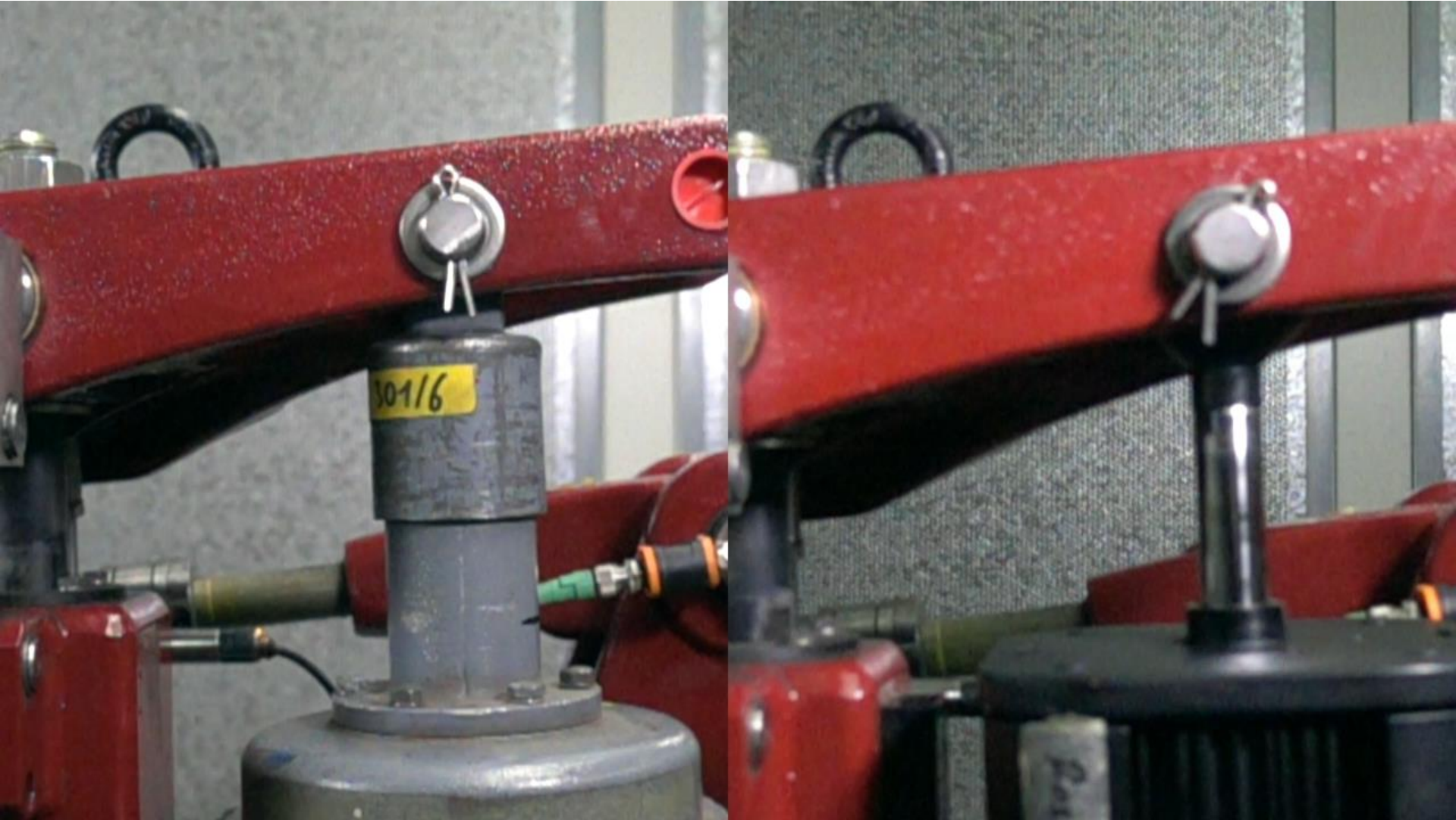


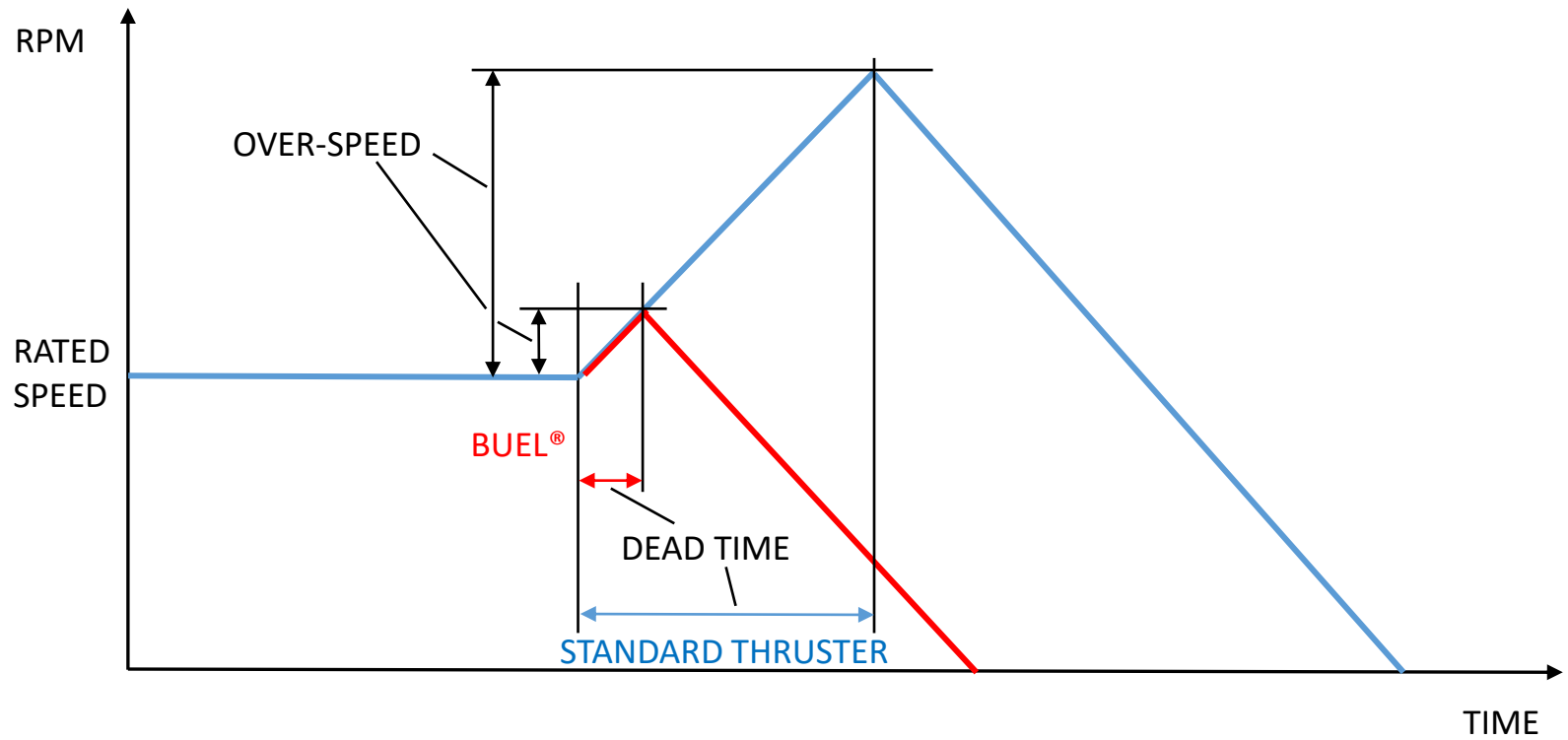
0 ms

Conventional Thruster

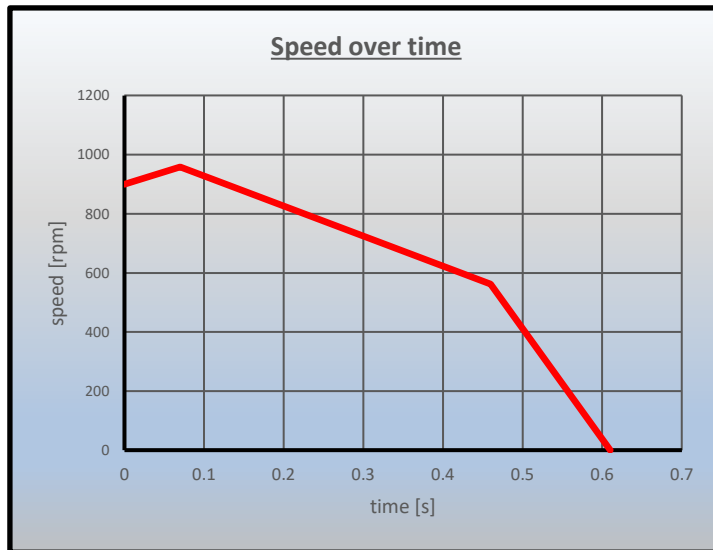


0 ms



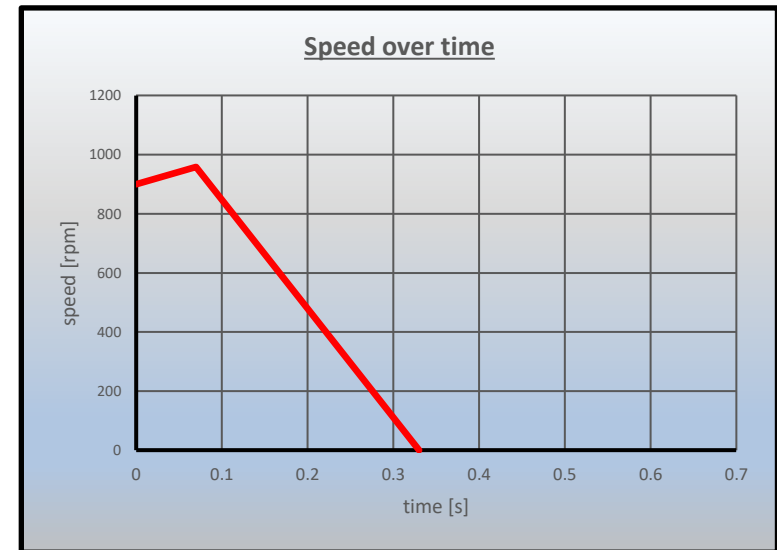


Standard thruster



Stopping distance: 0.67 m

BUEL[®] thruster



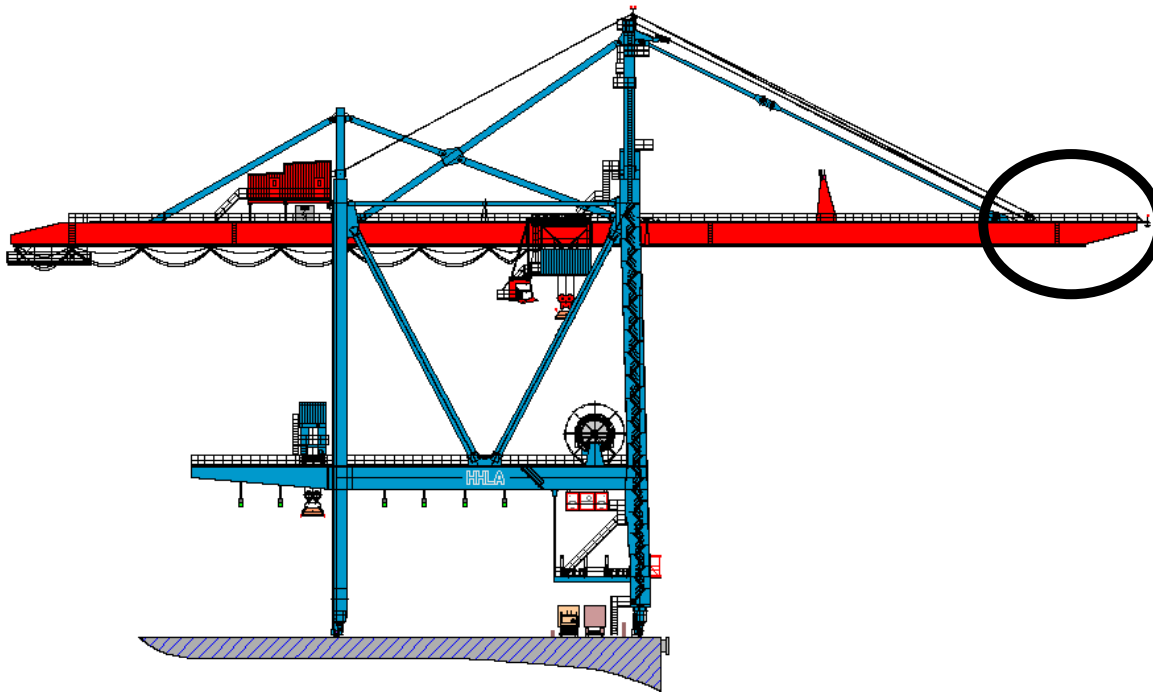
0.32 m

Conclusion:

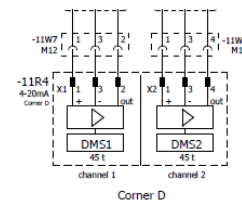
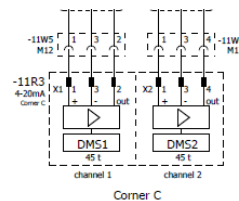
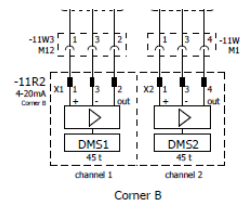
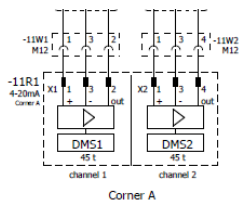
Stopping distance with BUEL[®] thruster is **52%** shorter compared to standard thruster

SF brakes with fast setting valve ($t_0=0.07s$)

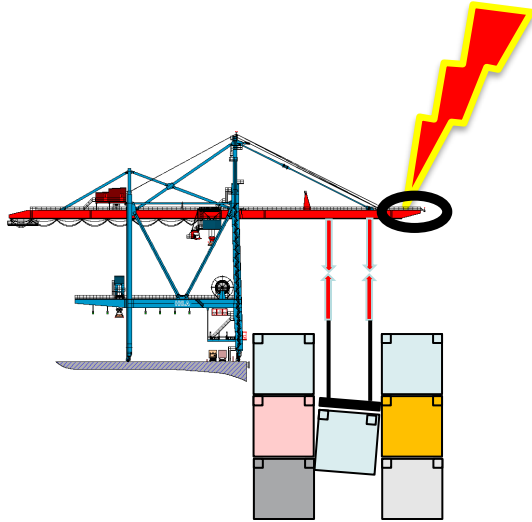
How to recognize SNAG?



- 4 two-channel load pins are installed in the boom tip

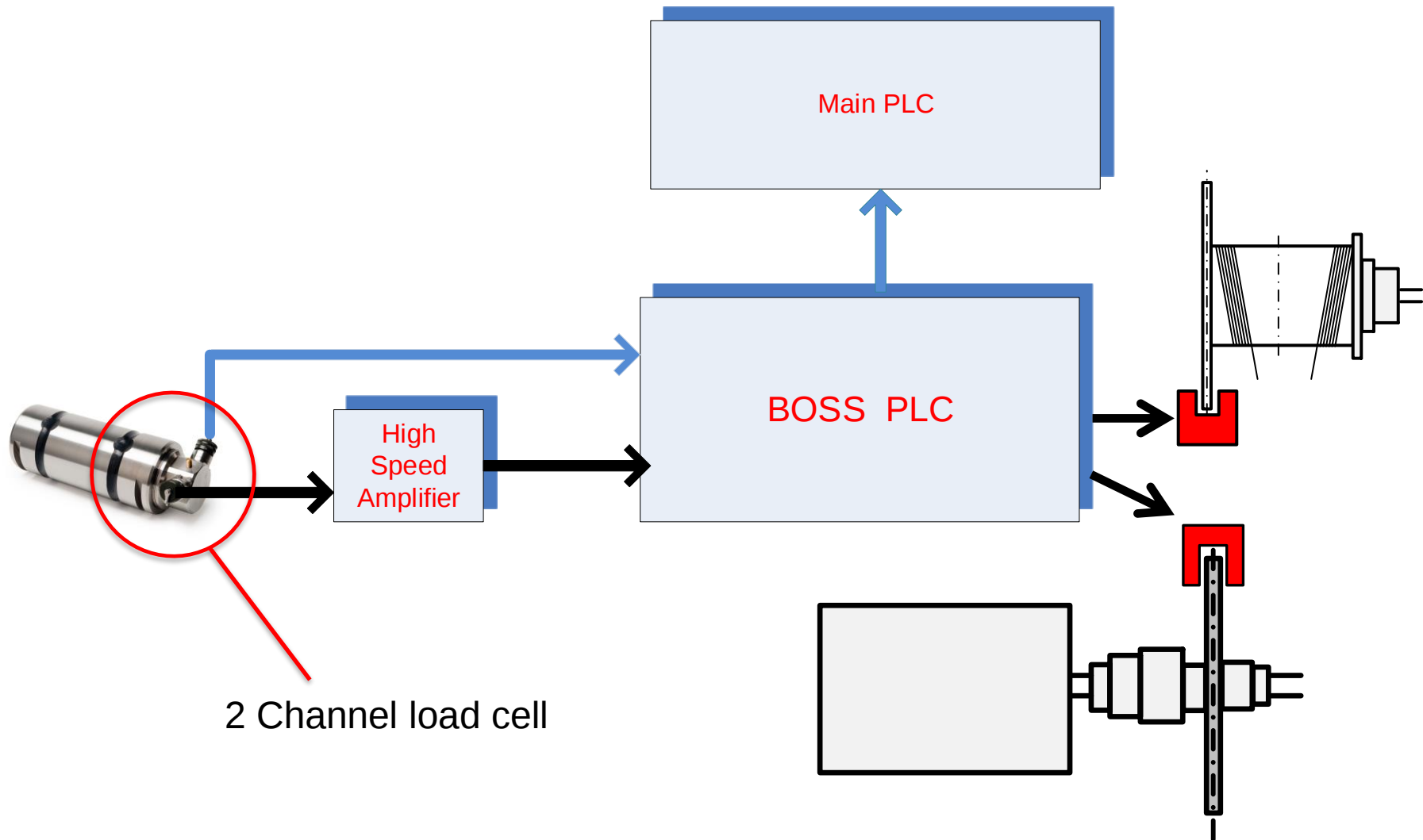


How does the BOSS® system react after we recognized SNAG?

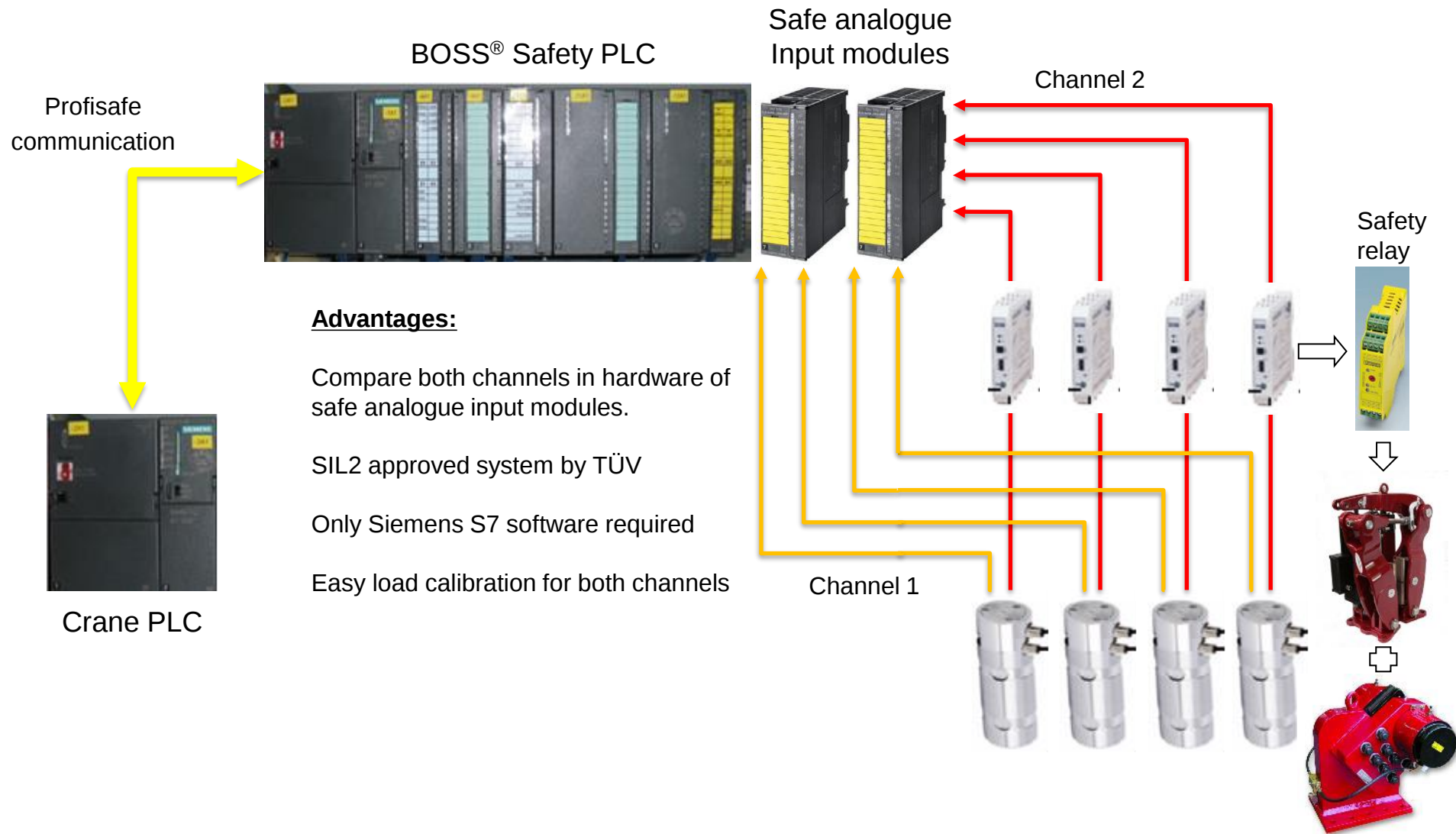


1. Load pin is detecting overload
2. BOSS PLC will cut off power for thrusters and HPU for emergency brakes (electrical reaction time 20ms until brakes starts closing
3. BOSS PLC sends a hardwired signal to the crane PLC to stop the motors
4. Service brakes apply full braking torque 36ms after snag is detected
5. Emergency brakes apply full braking torque 70ms after snag is detected
6. Hoist motor will be stopped between **100 to 200ms** after snag has been detected

How to recognize SNAG?



How to recognize SNAG?



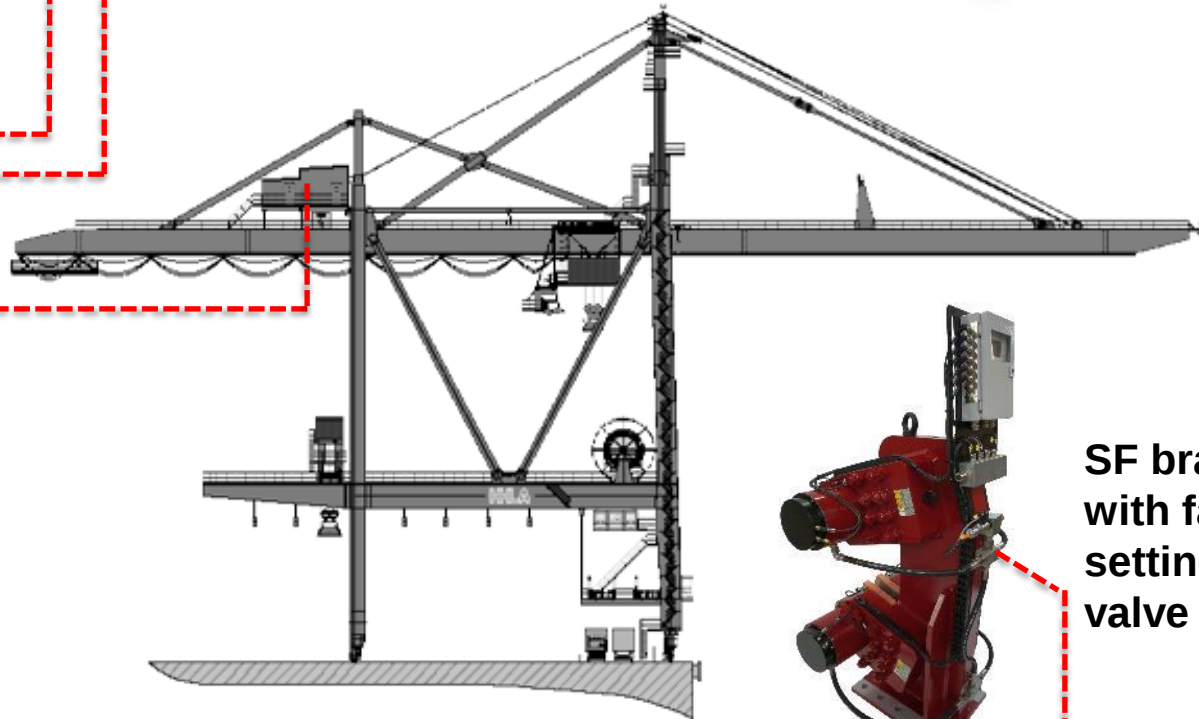
Snag Protection BOSS® – Main components

**Fast setting
service brake
with BUEL®
thruster**

2 channel load pins



**Electrical cabinet
with BOSS® PLC**



**SF brake
with fast
setting
valve**



Safe overload electronic

Cut off values (to be provided by Crane OEM)

Crane OEM: _____ Date: _____

OEM job no: _____ Name: _____

PIBU job no: _____

Project name: _____

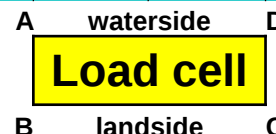
Overload system setting

[] ECPS8 [X] Profisafe

S7



Load Definition						Cut off values overload system									document rev.5	
input	Data	mode	Load	Spreader	Total	K1	K2	K3	K4	K5	K6	K7	K8			
from crane PLC to Terminal	set		under Spreader	Head block	load 100%	overload single corner	Overload warning 90%	Difference left/right (A+C)-(B+D)	slack rope	Overload left side	Overload right side	Overload total 110%	System Error			
						A or B or.....	A+B+C+D	(A+C)-(B+D)	A+B+C+D	A+C	B+D	A+B+C+D				
	0	single 20'	50, t	17, t	67, t	28,7 t	62,9 t	25, t	9, t	46,5 t	46,5 t	72, t	_____			
DI 1	1	single 40'	50, t	17, t	67, t	28,7 t	62, t	25, t	9, t	46,5 t	46,5 t	72, t	_____			
DI 2	2	single 45'	50, t	17, t	67, t	28,7 t	62,9 t	25, t	9, t	46,5 t	46,5 t	72, t	_____			
DI 3	3	twin 20'	65, t	17, t	82, t	32,7 t	75,5 t	32, t	9, t	52,9 t	52,9 t	88,5 t	_____			
DI 4	4	hook	100, t	8, t	108, t	28,2 t	98, t		5, t	56,5 t	56,5 t	118, t	_____			



Load under spreader +10% +Spreader head block= Overload total 110%

Example: DI3: 65t+6.5t+17t=88.5t

Safe overload electronic SIL2 Certificate

ZERTIFIKAT ◆ CERTIFICATE ◆ 認証證書 ◆ CERTIFICADO ◆ CERTIFICAT



Ind. stre Service

Certificate

Notified body: TÜV SÜD Industrie Service GmbH
Westendstr. 199
80686 München - Germany

**Applicant/
Certificate holder:** PINTSCH BUBENZER GmbH
Friedrichshüttenstr. 1
57548 Kirchen-Wehbach - Deutschland

Date of order: 2017-08-17

Manufacturer: PINTSCH BUBENZER GmbH
Friedrichshüttenstr. 1
57548 Kirchen-Wehbach - Deutschland

Product: Overload detection for ROSS Controls

Test laboratory: TÜV SÜD Industrie Service GmbH
Department hoists and cranes
Westendstr. 199
80686 München - Germany

**Date and
number of the test report:** 2017-03-22
2773321-10

Test regulations: DIN VDE 0100-410:2007-06
DIN EN 60204-32:2009-03
DIN EN ISO 13849-1:2008-12
DIN EN ISO 13849-2:2013-02

Validity: This certificate is valid 2022-09-25

Result: The equipment fulfils the safety requirements of the LC-Directive, Annex I, for the respective scope of the test report are stated on page (1 - 5). The overload detection for single hoist cranes fulfils performance level 'u' / SIL class 2.

Date of issue: 2017-03-28

Signature: 
Name: Anton Gold
Senior Expert

Note: The English text is a translation of the German original. In case of any discrepancy, the German version is valid only.

TUV[®]



Thank you for your attention!
