



المهارة الذكية
Smart Skill

SHEAR STUD SOLUTIONS

Shear Connectors | Ceramic Ferrules
Stud Welding Machines



*Reliable Solutions
for Composite Steel Construction*



ABOUT SMART SKILL

Company Overview

Smart Skill Contracting Est. is a Saudi Arabia-based specialist manufacturer and supplier of shear stud connectors, ceramic ferrules, stud welding machines, and related accessories for composite steel-concrete construction. We serve steel fabricators, engineering consultants, main contractors, and infrastructure developers across the Kingdom and the wider Gulf region with reliable products, technical support, and dependable supply.

Through a practical understanding of site conditions and structural design requirements, Smart Skill delivers shear connector solutions engineered for efficient installation, consistent weld quality, and long-term structural performance.

Company Information

Company Name	Smart Skill Contracting Est.
Commercial Registration No.	7016908217
Country	Kingdom of Saudi Arabia.
Address	Sari Street, As Salamah, Jeddah 23436, Saudi Arabia
Core Business	Manufacturing & supply of shear stud connectors (Type B), ceramic ferrules, stud welding machines, and welding consumables
Markets Served	Saudi Arabia & GCC - steel fabrication, EPC contractors, infrastructure & building projects



Company Overview

- Dedicated technical support for shear connector design verification, submittal documentation, and site installation guidance.
- Consistent, traceable product quality backed by recognised international standards.
- Reliable local stock holding and supply continuity for project schedules across Saudi Arabia and the GCC.
- Full documentation package for consultant and client approval: datasheets, method statements, MSDS, installation guidance, and warranty.

Vision

To become a leading regional manufacturer and supplier of certified shear connector and stud welding systems, recognised by consultants and contractors across Saudi Arabia and the GCC for product reliability, technical competence, and dependable project support.





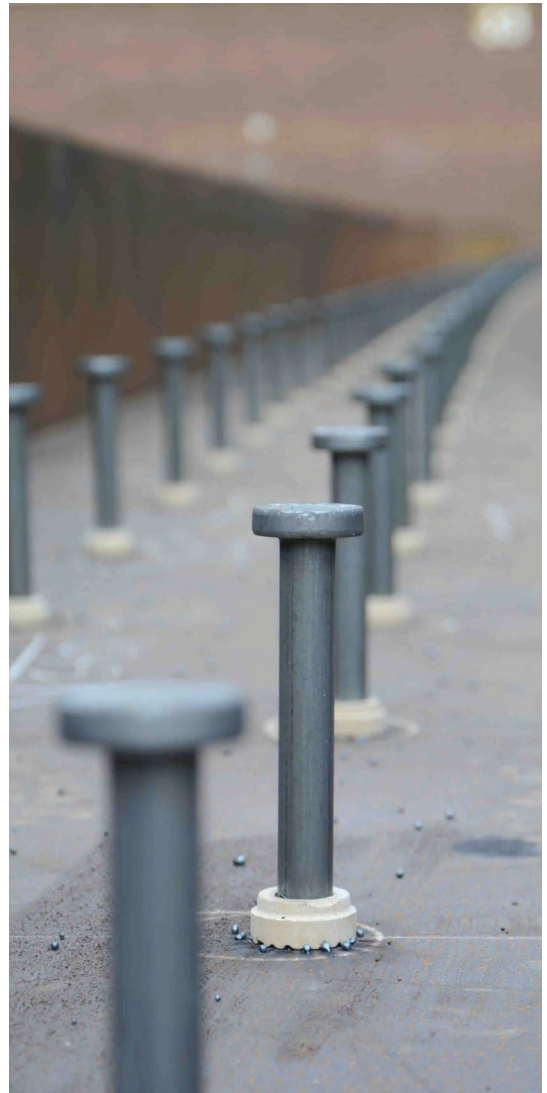
ABOUT SMART SKILL

Product Range

- Headed shear stud connectors - Type B, diameters 10 mm to 25 mm, manufactured to ISO 13918.
- Ceramic ferrules - ISO 13918 Type UF/WTB series, matched to all standard stud diameters.
- Drawn-arc stud welding machines - SCR (SDA) and Inverter (SDAi) series, 1600A to 3150A output.
- Stud welding guns, stud chucks, and ferrule holders - full accessory range.

Quality & Compliance

All shear connectors are manufactured and tested in accordance with **ISO 13918**, with welding processes qualified to **ISO 14555** and **AWS D1.1**. Stud base material is independently qualified, and production is governed by an ISO 9001:2015 Quality Management System with audited Factory Production Control, ensuring consistent compliance with project specifications based on Eurocode 4 and equivalent international codes.





Dimension

Standard: ISO 13918, AWS D1.1, AWS D1.5, BS 5400, AS/NZS 1552.4, JIS B 1198

DIMENSION (Unit: mm)							Flux	
D1	L1	D5	h3	D3*	h*	L1 Burn off*	Depth max.	Height Min.
10	27 - 155	18	7	13	2.5	3	1	0.7
13	27 - 155	22	8	17	3	3	1	0.7
16	50 - 155	32	8	21	4.5	4	1	0.7
19	75 - 255	32	10	23	6	4.5	1.4	1.15
22	100 - 255	35	10	29	6	5	1.4	1.15
25	100 - 255	41	12	31	7	5.5	1.4	1.15

Note: *denotes estimate value

L2 = L1 - L1 Burn off

Material & Mechanical Properties

Smart Skill shear connectors are supplied for composite steel construction applications where reliable shear transfer, stable welding performance, and dimensional consistency are critical.

Materials	Mild Steel SWRCH18A / ML15AI	Stainless Steel 304HC / 316Cu
Tensile strength min.	450N/mm ²	500N/mm ² - 780N/mm ²
Yield strength (Rp0.2) min.	350N/mm ²	350N/mm ²
Elongation (A5) min.	15%	20%
Wire surface treatment	Phosphate plating	Film coating

Smart Skill Shear Connector Advantages

Features	Advantages
Phosphated steel wire	Anti-rust, high precision forming, High-light surface
Max. Depth 1.6mm aluminum flux	Avoid weld joint stoma, improve weld strength
Automatic flux installation technology	High consistent flux, improve weld quality
Fat weld end with round chamfer	Avoid arc-blow effect probability
0.4mm depth of head-mark area	Offer maximum vertical shear force



TECHNICAL INFO

What's shear connector?

Shear Connector are typically used in composite steel construction to tie the concrete slab to steel members and resist shear force between the concrete slab and steel members.

It's one of a classic application of drawn arc stud welding technology. It is widely used in steel constructions, bridges, power station, traffic station, oil and gas station, etc.



3 Factors of shear connector



CHEESE HEAD

Effective thickness of stud head offer vertical shear force against the concrete slab.

Stud chuck hold and electric conduct during the welding process.

Precision diameter of stud head match the stud chuck, provide consistent weld quality

FLUX

Essential factor for drawn arc stud welding.

Flux depth is important to prevent stoma of the welding joint.

Complete same flux assures consistent welding quality.

The aluminum element is important for cleaning the weld area and helpful for weld bath killed.

SHANK

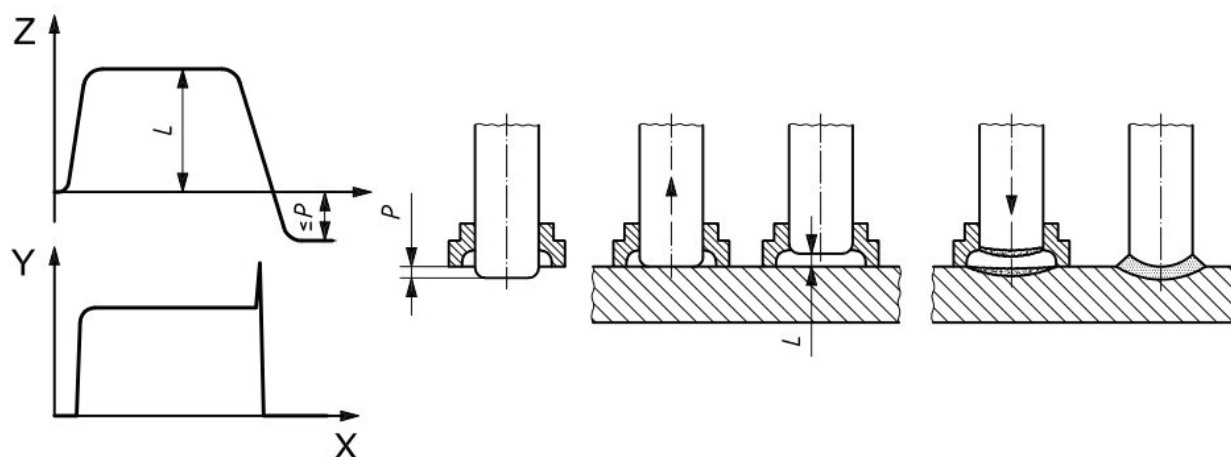
Offer horizontal shear force against the concrete slab.

Absolutely not less than standard diameter which is great importance to match the design force requirement.

There should be no oil or rust at least 50mm at the welding end.



THE PROCESS OF SHEAR CONNECTOR DRAWN ARC STUD WELDING



P: Protrusion L: Lift X: Weld Time Y: Weld Current Z: Stud Movement

THE APPLICATION SCOPE OF SHEAR CONNECTOR STUD WELDING

Weld Process	Weld Time	Diameter and Weld Position	Weld Current	Weld Pool Protection	Min. Sheet Thickness
Drawn arc stud welding with ceramic ferrule	> 200ms	10 - 25 PA 10 - 19 PE 10 - 16 PC	800A - 3000A	CF	0.25d

PA: Flat welding position; PC: Horizontal welding position; PE: Overhead welding position

QUALIFIED



Stud Base
qualified by TÜV SÜD



ISO9001:2015 QMS
certified by SGS



Factory Production Control
certified by DNV-GL



STUD FEATURES



0.01mm

High precision multistage cold formed ensure high precision and consistent studs dimension.

Complete flat weld end with round chamfer.

360°

High precision dimension make the studs easy to load into the weld gun chuck and hold tight properly.

Flat weld end with round chamfer make the studs easy to insert into the ceramic ferrule hole, offer 360° weld collar.

490Mpa

Made by high quality phosphate plating mild steel wire, ensure studs mechanical properties and welding properties, absolutely without cracks.

Over 490MPa tensile strength match the requirement of steel bridge's code.

1.4mm

Accurate calculated aluminium flux embedded by unique technology, fix into the stud weld end with only 1.4mm depth.

Consistency ensure the welding quality and avoid cavities in the weld joint.





CERAMIC FERRULE

Ceramic Ferrules are essential parts of the standard drawn arc stud welding process. In the process, the shear connectors are inserted into the center of hole of the ceramic ferrule, the ferrule will be pressed on the welding surface by ceramic ferrule holder with the force of spring device inside the stud welding gun.

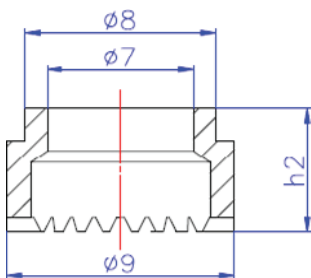


The ceramic ferrule is used for one weld only and is removed once the molten metal has solidified.

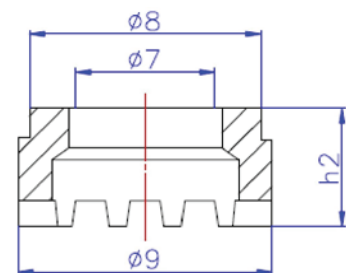
It has following functions:

- Protection of the weld pool by creation of metal vapour in the burning chamber at sufficient current intensity.
- Concentration and stabilization of the arc, thus reducing arc blow sufficient current intensity.
- Moulding of the displaced weld pool to a weld collar and supporting of the weld pool, furthermore, it shields the operator from both arc and spatter.

ISO 13918 : 2008 TYPE UF



Specification	Dimension					Pieces per Carton
	D7		D8 ± 1	D9 ± 1	h2 ≈	
	Min.	Max.				
UF10	10.2	10.7	15	17.8	10	1,000
UF13	13.1	13.6	20	22.2	11	900
UF16	16.3	16.8	26	30	13	500
UF19	19.4	19.9	26	30.8	16.7	400
UF22	22.8	23.3	30.7	38.5	18.5	200
UF25	26.0	26.5	35.5	41	21	200



Specification	Dimension					Pieces per Carton
	D7		D8 ± 1	D9 ± 1	h2 ≈	
	Min.	Max.				
WTD13	12.9	13.4	19	25	13	900
WTD16	16.3	16.8	26.1	30.6	15.8	400
WTD19	19.4	19.9	30.7	33.5	15	400
WTD22	22.9	23.4	33	39	19	250
WTD25	26.2	26.7	36	41	19	200



WELDING MACHINE

Advantages of Bolte® Germany Arc Stud Welding Technology

Bolte® Germany brand Arc Stud Welding Technology can weld studs, shear connectors with diameter from 8mm-25mm to workpiece within very short time. Some traditional welding processes like drilling, tapping, manual welding and so on are omitted in certain areas, which is significant for improving efficient and getting stable welding effects. They are widely used in steel reinforced concrete structures, steel constructions, shipbuilding, vehicle constructions, refractory industry and so on.

Safety

Very high degree of safety, thanks to cross-sectional joints

High Productivity

Fast welding for higher productivity.

Low Distortion

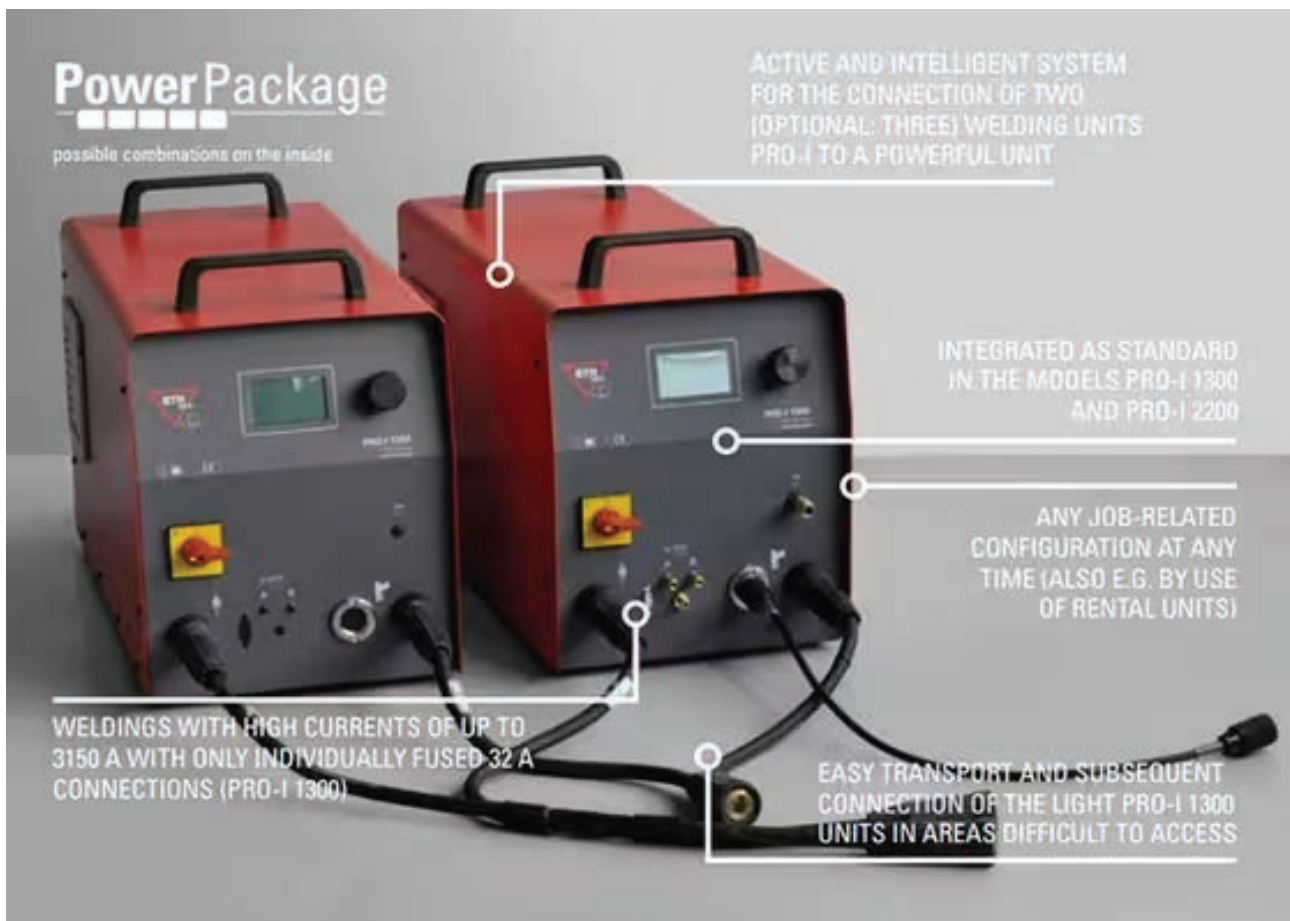
Minimal distortion due to low thermal stress.

One-Side Welding

Clean one-side welding with minimal reverse-side impact.

Easy Operation

Simple operation for trained personnel.



WELDING MACHINE



Welding Technology

Drawn Arc Stud Welding

Instructions

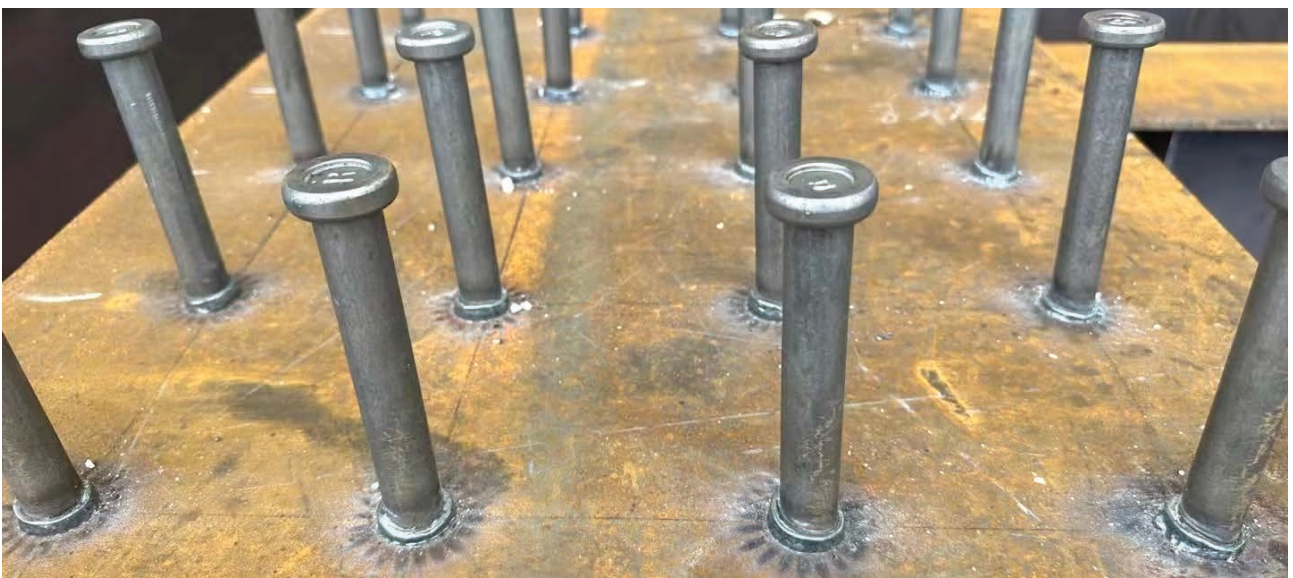
Output   Input  

Necessary Spare Parts

SAG Welding Gun
Shear Stud Chuck
Ceramic Ferrule Holder

SDA Advantages

- Ideal for shear connector welding.
- Adjust welding current and welding time precisely to get stable welding effects.
- Prevent repeat welding function.
- Over-load protection.
- Automatically compensate for voltage fluctuations.
- Optimized forward after the air diversion structure, heat dissipation stability, to avoid high-intensity work overheating overload.
- PIS single chip microcomputer or DSP digital chip.



HIGHLIGHTS

- ✓ improved process monitoring
- ✓ simplified production control by monitoring of all welding parameters and subsequent visual inspection
- ✓ comfortable, exact and fast adjusting of stud welding gun resp. automatic welding head
- ✓ optimised process cycle

BOLTE

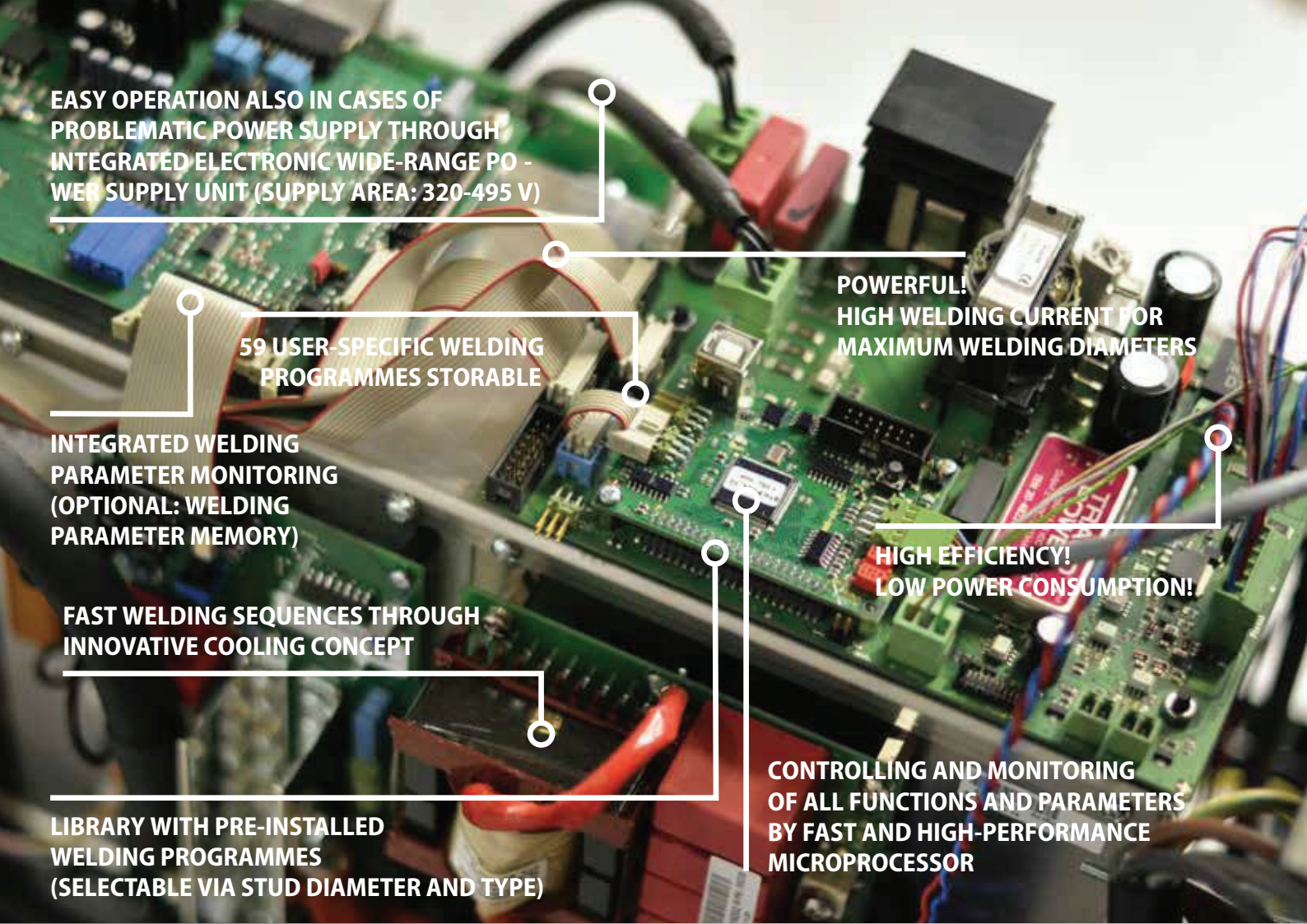


PRO-I

INVERTER STUD WELDING UNITS FOR DRAWN ARC AND SHORT CYCLE STUD WELDING
MODERN INVERTER TECHNOLOGY FOR EXCELLENT WELDING QUALITY



STUD WELDING



EASY OPERATION ALSO IN CASES OF PROBLEMATIC POWER SUPPLY THROUGH INTEGRATED ELECTRONIC WIDE-RANGE POWER SUPPLY UNIT (SUPPLY AREA: 320-495 V)

59 USER-SPECIFIC WELDING PROGRAMMES STORABLE

INTEGRATED WELDING PARAMETER MONITORING (OPTIONAL: WELDING PARAMETER MEMORY)

FAST WELDING SEQUENCES THROUGH INNOVATIVE COOLING CONCEPT

LIBRARY WITH PRE-INSTALLED WELDING PROGRAMMES (SELECTABLE VIA STUD DIAMETER AND TYPE)

**POWERFUL!
HIGH WELDING CURRENT FOR MAXIMUM WELDING DIAMETERS**

**HIGH EFFICIENCY!
LOW POWER CONSUMPTION!**

CONTROLLING AND MONITORING OF ALL FUNCTIONS AND PARAMETERS BY FAST AND HIGH-PERFORMANCE MICROPROCESSOR



WELDING PROGRAMME STORAGE FOR EACH GUN CONNECTION

OPTIONAL (ALSO RETROFITABLE): SHIELDING GAS MODULE AND/OR AUTOMATIC MODULE FOR EACH GUN CONNECTION

WELD COUNTER FOR EACH GUN CONNECTION

**MULTI GUN UNITS
OPTIONAL
FOR PRO-I 2200 AND PRO-I 2800
(ALSO RETROFITABLE):
TWO OR FOUR GUN
CONNECTIONS**

**DIFFERENT ADJUSTMENT
VALUES FOR WELDING
CURRENT AND TIME FOR
EACH GUN CONNECTION**

**AUTOMATIC DETECTION
OF USED GUN**

MODERN INVERTER TECHNOLOGY ENSURES VERY PRECISE CONTROL AND HIGH REPRODUCIBILITY OF THE WELDING PROCESS

VERY HIGH ARC STABILITY! ALSO IN CASES OF SHORT WELDING TIMES AND LOW WELDING CURRENTS

CONSTANT CURRENT REGULATION

IDEALLY SUITED FOR MOBILE USE - CONSIDERABLY LOWER WEIGHT THAN CONVENTIONAL STUD WELDING UNITS

EASY OPERATION BY ROBUST ROTATING PRESSURE SWITCH

WELDING CURRENT AND TIME CONTINUOUSLY ADJUSTABLE

ALL FUNCTIONS AND PARAMETERS ARE SHOWN ON A BIG DISPLAY

ROBUST CONSTRUCTION FOR THE USE IN HARSH ENVIRONMENTS

PROTECTION OF THE ELECTRONICS THROUGH AIR FILTER

Power Package

possible combinations on the inside

ACTIVE AND INTELLIGENT SYSTEM FOR THE CONNECTION OF TWO (OPTIONAL: THREE) WELDING UNITS PRO-I TO A POWERFUL UNIT

INTEGRATED AS STANDARD IN THE MODELS PRO-I 1300 AND PRO-I 2200

ANY JOB-RELATED CONFIGURATION AT ANY TIME (ALSO E.G. BY USE OF RENTAL UNITS)

WELDINGS WITH HIGH CURRENTS OF UP TO 3150 A WITH ONLY INDIVIDUALLY FUSED 32 A CONNECTIONS (PRO-I 1300)

EASY TRANSPORT AND SUBSEQUENT CONNECTION OF THE LIGHT PRO-I 1300 UNITS IN AREAS DIFFICULT TO ACCESS

HIGHLIGHTS AND SPECIAL EQUIPMENT

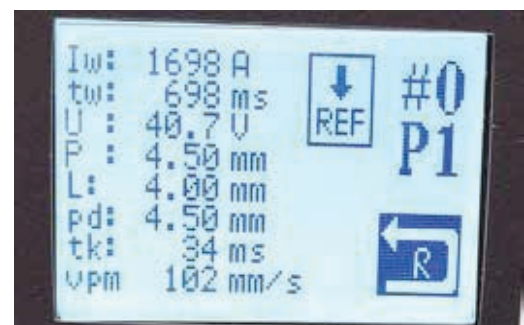
WELDING PARAMETER MONITORING AND DOCUMENTATION

The welding parameter monitoring, integrated as standard in all series PRO-I stud welding units, enables a quality control of the finished welds. The units can detect each discrepancy from the ideally permitted values. So the welding supervisor and the operator can immediately recognise deficits in the welding operation like insufficient balancing of blowout effects, tilt of the welding gun etc. Consequently, the production control can be reduced to monitoring and recording of all welds by the unit and a subsequent visual inspection.

Features:

- » recording of welding current, welding time and voltage for each weld
- » recording of stud protrusion before the weld as well as stud travel (lift, immersion depth, immersion speed and short-circuit time) during the weld (only when a welding gun resp. an automatic welding head with travel measuring system is used)
- » comparison of the recorded welding parameters (actual values) to the parameters of a reference weld (set values) (tolerances adjustable)

- » in case of variances to the reference weld a warning is displayed or the unit is locked for further welds until the release by the operator (functionality can be switched off)
- » storage of the last ten welding parameter sets
- » optional (also retrofitable): welding parameter memory for the storage of 16000 welding parameter sets (storage with date and time) with USB-interface for data transmission (welding parameter sets) to a PC



COMFORTABLE, EXACT AND FAST ADJUSTING OF STUD WELDING GUN RESP. AUTOMATIC WELDING HEAD

- » The values for stud protrusion and lift that are adjusted on the gun resp. the welding head can be shown in the display of the unit. Thus, the gun resp. the welding head can be adjusted

very comfortable, exact and fast. (only when a welding gun resp. an automatic welding head with travel measuring system is used)



AUTOMATIC STUD FEEDING

- » An automatic module enables the connection of the automatic stud feeder VBZ and an automatic welding gun.
- » For multi gun units each gun connection can be equipped with an automatic module.





ADAPTER BOX PRO-SPLIT

- » available as accessory for all series PRO-I units
- » enables the operation of up to four stud welding guns with different adjustment values for welding current and time on one unit
- » automatic detection of used gun
- » weld counter for each gun connection
- » with up to four shielding gas modules



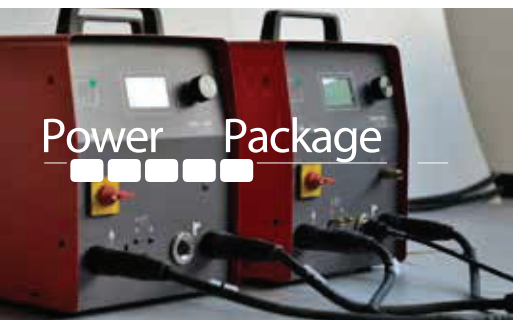
SHIELDING GAS MODULE FOR STUD WELDING WITH SHIELDING GAS

- » optionally available for all series PRO-I units
- » enables stud welding with shielding gas for weld pool backing
- » shielding gas pre- and post-flow time continuously adjustable
- » For multi gun units each gun connection can be equipped with a shielding gas module.



TROLLEY DESIGN

- » optional for PRO-I 2200/2800 (also retrofittable): design as trolley for mobile use on construction sites
- » two big, extremely robust castors
- » pull-out telescopic handle



POSSIBLE COMBINATIONS POWER PACKAGE

PRO-I 1300 + PRO-I 1300:	max. welding current/time: 2100 A/1500 mS ⇒ max. welding diameter 22 mm
PRO-I 1300 + PRO-I 1300 + PRO-I 1300:	max. welding current/time: 3150 A/1500 mS ⇒ max. welding diameter 25 mm
PRO-I 2200 + PRO-I 1300:	max. welding current/time: 3150 A/1500 mS ⇒ max. welding diameter 25 mm

TECHNICAL DATA AND CHARACTERISTICS

	PRO-I 1300	PRO-I 2200	PRO-I 2800
Welding range (Ø mm)			
Stud welding with ceramic ferrule	3-13	3-22	3-25
Stud welding with shielding gas	3-12	3-12	3-12
Short cycle stud welding with or without shielding gas	2-10	2-10	2-10
Welding current (A)	100-1050	100-2100	100-3150
Welding time (mS)	1-1500	1-1500	1-1500
Constant current regulation	x	x	x
Welding parameter monitoring			
Welding parameter monitoring	x	x	x
Welding parameter memory with USB-interface for data transmission to a PC	o	o	o
Gun connections			
1 gun connection	x	x	x
2 gun connections		o	o
4 gun connections		o	o
Utilisable with adapter box PRO-SPLIT	x	x	x
Suitable for through deck welding		x	x
Operation			
Microprocessor control	x	x	x
Welding programme library	x	x	x
Welding programme storage	x	x	x
Device lock with PIN code	x	x	x
Authorization concept (device lock, basic settings, menu structure)	x	x	x
Weld counter (resettable)	x	x	x
Lift test	x	x	x
Repeat cycle lock	x	x	x
Electronic function control	x	x	x
Self diagnosis system	x	x	x
Automatic function test	x	x	x
Shielding gas module	o	o	o
Automatic stud feeding	o	o	o
Error diagnosis systems			
Excess temperature	x	x	x
Phase failure	x	x	x
Damage on welding/control cable	x	x	x
Damage on solenoid	x	x	x

	PRO-I 1300	PRO-I 2200	PRO-I 2800
Interfaces			
CAN-BUS	o	o	o
USB	o	o	o
Thermic controlled ventilator	x	x	x
Trolley design with two big, extremely robust castors and pull-out telescopic handle		o	o
Lifting eyes		x	x
2 swivel castors, 2 fixed castors		x	x
Robust, powder-coated metal housing	x	x	x
Dimensions			
Width (mm)	290	550	550
Height (mm)	360	850	850
Length (mm)	650	650	650
Weight (kg)	31	81	102
Electric connection			
Mains supply (V) at 50/60 Hz	320-495	320-495	320-495
Mains fuse external	35 AT	63 AT	125 AT (optional: 63 AT)
Mains plug CEE	32 A	63 A	125 A (optional 63 A)
Protection	IP 23	IP 23	IP 23
Control cable socket for welding guns	12-pin	12-pin	12-pin
Suitable welding guns			
PHM-10	x	o	o
PHM-12	x	o	o
PHM-160	o	o	o
PHM-161	o	o	o
GD 12sc	x	o	o
GD 12	x	o	o
GD 15	x	o	o
GD 16	x	o	o
GD 19	o	x	x
GD 22	o	x	x
GD 25	o	o	x
PHA-500	o	o	o
PHA-500-6	o	o	o





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