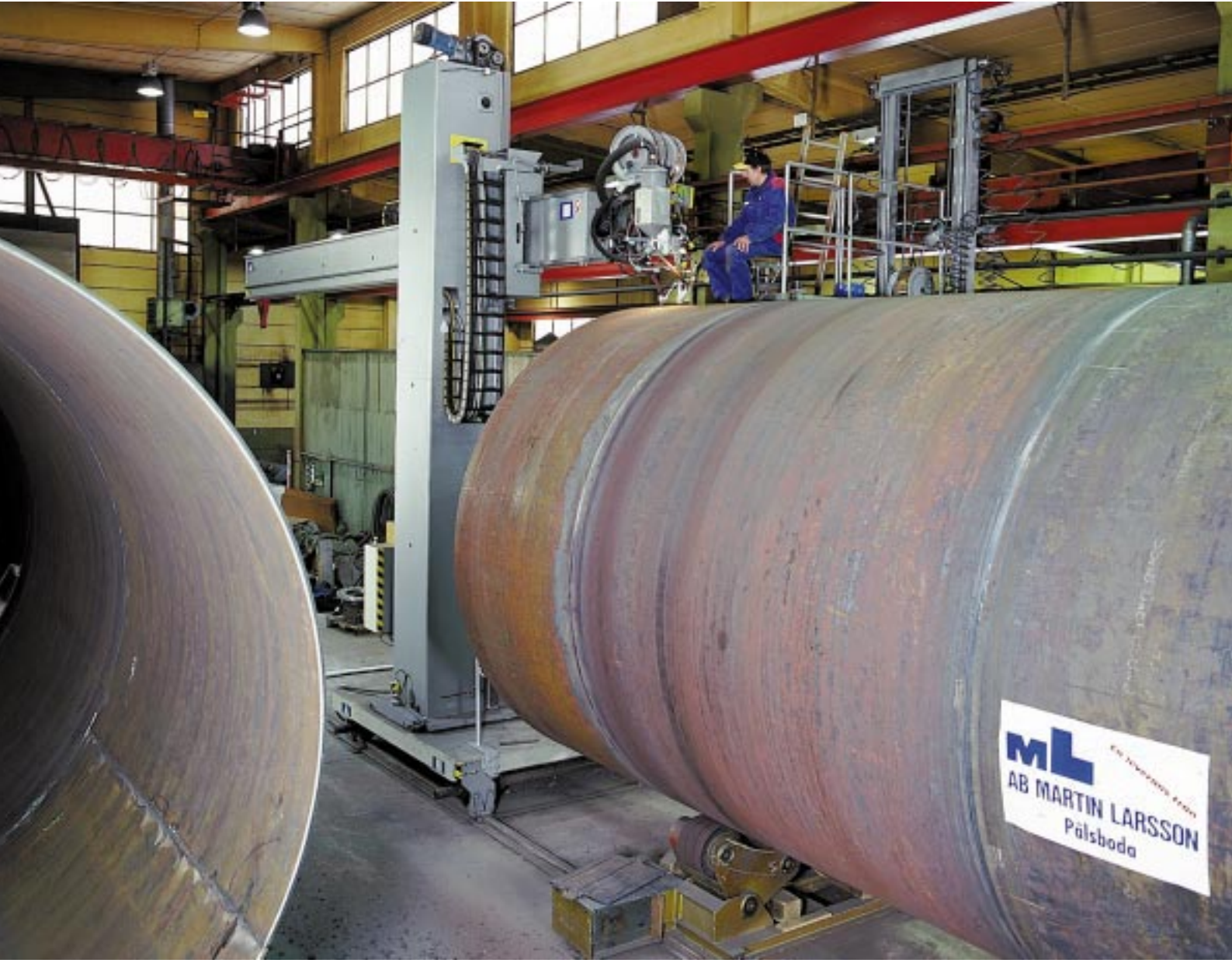

Figure 1.

Advanced process control could be the difference between successful and unsuccessful welding results

by Billy Höög, ESAB Welding Equipment AB, Laxå, Sweden

A successful weld is dependent on a number of different factors, such as the types of material that are going to be joined, the filler metals, the design of the workplace and the ability the welding equipment has to control the process. ESAB's contribution to a successful welding result is the new PEH Process Controller.

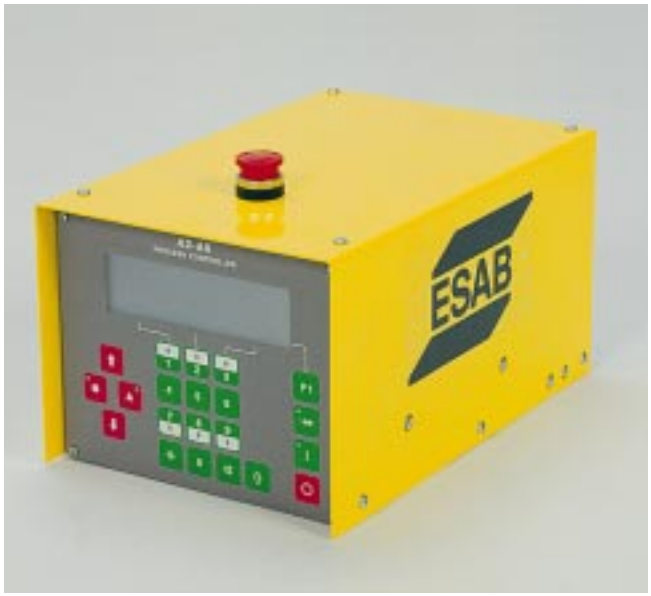

Figure 2. PEH control unit.

Main menu
Example of a display image if welding with a constant welding current (CA) is selected

A 35 — Selected welding current in amperes

Example of a display image if welding with a constant wire-feed speed (CW) is selected

cm/min 110 — Shows the selected wire-feed speed

Display image when welding with a constant wire-feed speed (CW) is in progress

35 A — The resulting welding current after the start of welding

For selections of (CA) or (CW), please consult the "ADVANCE SETTINGS WELDING" menu

SET 1	Shows that parameter set 1 of a possible 10 has been selected
30 kJ/cm	Specifies the heat input that is obtained with the selected values for welding current, arc voltage and pass speed
V 33.0	The selected arc voltage in volts
cm/min 23	The selected pass speed
	Specifies the type of start (selected in the advance welding settings)
	Specifies the direction of movement selected in the advance welding settings)
	Specifies whether the valve outlet is open or closed. In this case, it is open
3.0	Wire diameter (selected in the advance welding settings)

Figure 3.

The PEH unit is designed for use with ESAB's A2 and A6 automatic welding systems for SAW or MIG/MAG applications.The control unit is used in conjunction with the LAF (DC) and TAF (AC) power sources.

Integration of the control system in the power source guarantees precise process reliability, all functions required to control the welding process are included in the control panel.

Welding power sources – part of PEH

The welding power sources have been specially adapted to work together with the process controller. They are linked by a "two-wire bus", which makes it possible to regulate and control the welding process with far more precision than was previously feasible. The power source output can be adjusted directly from the control panel on the PEH.

ESAB's previous generation of welding power sources, such as the LAH, LAE and TAE, can be adapted for use with the new control unit using a conversion kit. New power sources are already prepared for the extremely straightforward connection to the PEH Process Controller, and provide the 42 V required for their operation.

User-friendly

The PEH is easy to use after a minimum of training. With a selection of 12 different languages, the system is monitored continuously and deviations from the set welding data are indicated on the display as error messages. When the power source is turned on, it is identified automatically by the control system and no manual re-adjustment is needed if it is changed. One of the main benefits of the control system is that the same PEH Process Controller can be used for different welding processes and different filler wire types. The characteristics of the power source are optimised for the selected process and wire type to be used. See Figure 2.

Manual or automatic operation

The PEH Process Controller can have welding parameters set manually or recalled from memory.
If manual operation is selected, wire feed and movements are controlled manually and the welding parameters and other welding settings that are needed for the weld in question are pre-set manually.

When welding in the automatic mode, a pre-set group of welding parameters can be selected and the relevant welding parameters can be precision adjusted. There are a total of ten different sets of parameters, for a given process and wire combination.

The control unit is ready for manual operation the moment the unit is switched on. When welding begins, automatic operation takes over. If the welding stops or an error occurs, the system returns to manual operation.

Menus

The PEH software has a number of menus, including the main, pre-setting display and error list menus and the system configuration.

Advance welding settings

	A	B	C
1	Direction	▲ triangle ■ square	
2	Start	Direct Scratch	
3	Welding stop	Crater filling (ms) Burnback time (ms)	10-3,000 10-3,000
4	Wire data	Wire type Wire diameter if “Solid” has been selected if “Flux-cored” has been selected if “Strip” has been selected Wire material Number of wires	Solid, Flux-cored, Strip 0.8 1.01.2 1.6 2.0 2.4 3.0 3.2 4.0 5.0 6.0 0.8 1.01.2 1.6 2.0 2.4 3.0 3.2 4.0 30 x 0.5 60 x 0.5 100 x 0.5 Fe, Al, SS 1, 2
5	Control	CA, CW	

Figure 4.

Main menu

In the main menu, the welding current, arc voltage and travel speed (if applicable) parameters are set. During the actual welding process, the operator can see the selected welding parameters and has the possibility to adjust them or select new and complete sets.

This menu also contains information about, and can display, heat input per cm, which of the ten possible pre-set parameter sets is in use and the parameter selected. If it has been decided under the pre-setting menu that the welding is to be performed at a constant wire-feed speed, both the value for the welding current and the wire-feed speed are shown during welding. See Figure 3.

Pre-setting menu

Under the pre-setting menu, it is possible to select the starting method, the welding direction, start and stop conditions, wire data such as the diameter, material and number of wires, as well as the type of control; constant current (CA) or constant wire-feed speed (CW). See Figure 4.

Different applications

The different setting menus which have restricted access are blocked using a password. These menus are used for example to set the desired user language, to decide whether the displayed value is to be metric or imperial and to select the configuration of the PEH for different types of welding equipment from ESAB.

The equipment suitable for use with the PEH control box includes A2/A6 welding tractors and welding heads, automatic system welders and columns and booms with the associated handling equipment such as roller beds and positioners. See Figures 1 and 5.

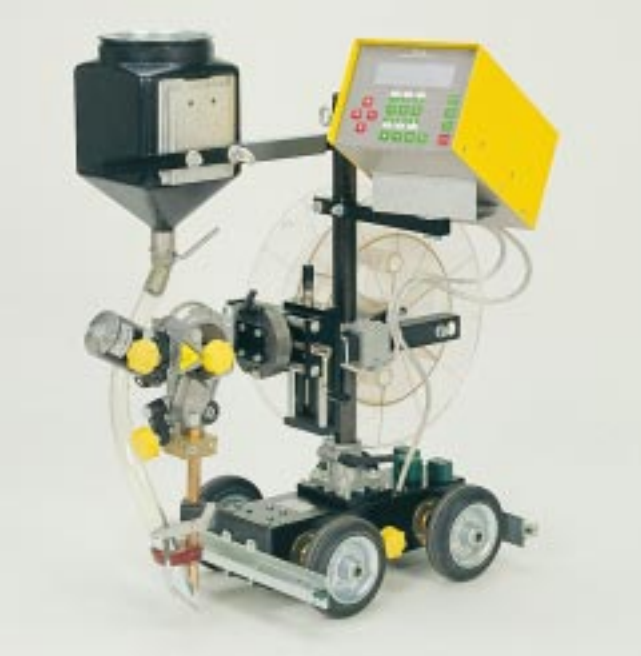

Figure 5. ESAB A2 welding tractor.

About the author

Billy Höög, European Welding Engineer, joined ESAB in 1976 and worked on the development of automation welding machines until 1982.

He then moved to the marketing department for Standard Automation where he was involved with mechanised TIG and submerged arc welding. Since 1999, he has been working at ESAB Welding Equipment AB, Automation & Engineering, as product manager for Standard Products.