1 Introduction

1.1 Product Overview

SmarTac is a tactile sensor used to find the location of inconsistent weld joints and offset the programmed points in a weld program. The main component is an electronic sensor board, which detects contact with the part feature to be located. The SmarTac board is supplied as an add-on unit and installed in the robot cabinet. A RAPID system module, SmarTac.sys, provided by ABB WSD supports powerful programming tools explained in section 5, *"The User's Guide."* SmarTac searching can be added to programs while programming a part, or it can be added to a pre-existing weld routine.

1.2 Operation Overview

With SmarTac a part feature may be "searched" using part of the torch. Typically the welding wire or the gas cup is used as the sensing portion of the torch. "Searches" are programmed into a weld sequence. Each search consists of two robtargets; one for the start location and one for the expected location of the part feature. While searching the torch feature (gas cup or wire) is energized with about 40VDC. When the torch feature makes contact with the part (at ground potential) an input is set in the robot controller. When the input is detected, robot location is stored and motion stops.

The Search instructions included in the SmarTac software are designed to return "offset"" information. In other words, the result of a search is the distance between where the original search location was programmed and where the robot has now found the part.

Using SmarTac effectively can dramatically reduce fixturing costs. It can also help account for part variability that can not otherwise be controlled.

1.3 Requirements Overview

1.3.1 System Prerequisites

This SmarTac version is intended for use in arc welding systems incorporating IRB 140,1400, 2400, etc. robots.

BaseWare requirements: 4.0 or higher.

Controller requirements: S4Cplus

The SmarTac package includes one system module that is loaded in the foreground task of the controller. The module, SmarTac.sys, is a stand-alone, read-only, no-step-in, module. Consequently, it is compatible with any RAPID program, assuming the I/O configuration is correct, and no previous version of SmarTac is loaded

1.3.2 User’s Qualifications

Any competent robot programmer (S4 RAPID language) may be self-taught to program and use basic SmarTac searches. Some complex searching techniques are best reserved for those programmers that have attended an advanced programming class offered by ABB, unless the programmer has a solid mathematical background.

For the robotic system operator, the addition of searches is largely transparent and requires no further training.

1.4 Precautions!

The power supply must always be switched off whenever work is carried out in the control cabinet.

Circuit boards - printed circuit boards and components - must never be handled without Electro-Static-Discharge (ESD) protection in order not to damage them. Use the wrist strap located on the inside of the controller door.

All personnel working with the robot system must be very familiar with the safety regulations outlined in the chapter on Safety in the robot controller User's Guide. Incorrect operation can damage the robot or injure someone