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HARMONIZED SYSTEM
COMMITTEE
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(+ Annexes)
O. Fr.

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CLASSIFICATION OF TOUCH PANELS

(Item IX.7 on Agenda)

Reference documents :

42.448 (HSC/22)
NC0160F2, Annex G/17 (HSC/24 – Report)

I. BACKGROUND

1. At its 24th Session, in October 1999, the Harmonized System Committee examined Doc. 42.448 "Possible amendments to the Explanatory Note to heading 84.71". Following its discussion, the Committee requested the Secretariat to prepare separate documents concerning the classification of twelve products one of which was "touch panels" (see Annex G/17 to Doc. NC0160E2). The Secretariat requested and received information on these products through the assistance of the International Chamber of Commerce (ICC). Having received no input from administrations, the Secretariat presents it own comments below concerning the classification of "touch panels", based on Doc. 42.448 (HSC/22) and the information received through the ICC.

II. SECRETARIAT COMMENTS

Scope of the expression "touch panels"

2. According to the information received from the Secretariat, mainly through the ICC (see Annex I hereto), touch panels perform the same functions as touch screens. The two expressions are virtually synonymous. These panels or screens enable the user to touch the surface of the screen with the finger (in some cases, gloved) or with a stylus or other means (the technology used by some touch screens requires them to be operated with the bare finger only), thereby interacting with co-ordinates and triggering action in relation to the data shown on the screen.

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3. The "Glossary of Touchscreen Related Terms" (www.touchscreen.com - © Mass Multimedia, Inc. 1999) defines "touchscreen" as follows : "an input device for a PC system. It uses a touch sensitive screen that is placed over the PC's video display, allowing the user to simply "touch the screen" to interact with the PC. The touchscreen system normally consists of a sensor (the screen itself), a controller and a software driver".

4. There are a number of different technologies for touch screens or touch panels, adapted to the type of application and the conditions of use, three of which are as follows : resistive technology (based on the change in electrical current that occurs when pressure is applied to the screen), capacitive technology (change in voltage), surface acoustic wave technology (use of ultrasound) and infrared technology (use of infrared rays), etc.

5. The design of touch screens depends on the technology used. They generally consist of one or two transparent panels to be mounted on the outside of a cathode ray tube (CRT) monitor or liquid crystal display (LCD) monitor. Those using resistive technology, for example, consist of a glass or acrylic panel coated with an electrically conductive and an electrically resistive layer (often of polyethylene) with a separation between them.

6. As mentioned in Doc. 42.448, paragraph 8 (3) touch panels perform two functions, i.e., as display units (output units) and as touch sensitive devices (X-Y co-ordinate input devices). Hence classification of these touch screens or panels for computers in subheading 8471.60 seems appropriate.

7. It is recalled that "touch-sensitive" screens are already mentioned in the Explanatory Note to heading 84.71, page 1406, Item (6), as X-Y co-ordinate input devices. It should be noted, however, that the documentation consulted indicates that the expression "touch-sensitive screen" in the English version might be taken to apply more particularly to screens employing resistive technology, the equivalent of the French "écran tactile" being "touch screen". Thus the present English version is perhaps more restrictive than the French.

Classification of "SattScope 240T" panels

8. The proposal to mention touch panels in the Explanatory Note to heading 84.71 was based on the description of an article called "SattScope 240T" and presented as follows :

> Touch-sensitive operator panel with a 240 x 128 pixel resolution CCFT back-lit screen divided into 48 touch-sensitive areas and having a flash memory (EEPROM) of 256 kbytes. This panel enables the operator to affect the process being performed simply by pressing the objects displayed on the screen. It is used in production plants as a local control panel. Its functions may include, for example, starting or stopping motors and opening or closing valves.

9. An illustration and some additional technical data are given in Annex II hereto. From this data it would appear that the panel has a function (control of production machinery) substantially different from that of touch panels (touch screens) for computers as described above, but operating on the same principle.

10. In accordance with Note 5 (D) to Chapter 84, X-Y co-ordinate input devices which satisfy the conditions of paragraphs (B) (b) and (B) (c) of that Note are in all cases to be classified as units of heading 84.71. And by virtue of Note 2 (a) to Section XVI that provision would still be applicable even if these panels were intended to form parts of particular machines.

11. The Secretariat recalls that when classifying the "Iris 3047" ink-jet printer (Doc. NC0160E2, Annex G/16, paragraph 9, HSC/24 – Report) the Committee agreed that paragraph (D) of Note 5 to Chapter 84 was to be interpreted in the general context of Note 5. This means that paragraph (D) should be read in conjunction both with subparagraphs (B) (b) and (B) (c) **and** with the introductory Part of Note 5 (B) and that the rules laid down in paragraph 5 (D) are applicable subject to the provisions of Note 5 (E), that is to say provided that these devices do not perform a specific function other than data processing. It should however be noted that the last-mentioned decision was the subject of a reservation which is to be examined under Item VIII.6 of the present Session's Agenda, and that this principle could therefore be called into question.

12. Given that these are control panels (operator panels) the Secretariat feels that if the Committee confirms its above-mentioned decision then heading 85.37 could be considered. It would also be necessary to check that these panels are used with an automatic data processing machine within the meaning of heading 84.71 and not with machines operating solely on the basis of fixed programs, for example.

13. Bearing in mind the points made above and the limited nature of the technical data available to it (information lacking on the exact nature and functions of these panels, their mode of operation, sectors of use, etc.) the Secretariat feels that it is difficult to come to a definite conclusion regarding the classification of the "Sattscope 240T" panel.

14. The Secretariat therefore suggests that, **provided that an administration so requests,** it should continue the study of this question on the basis of additional details to be obtained from the manufacturer or from administrations. It should be recalled that this article has not been the subject of a classification query but was simply presented as an example of a touch panel.

15. The Secretariat also feels that there would be no objection to inserting a reference in the Explanatory Note to heading 84.71 to touch panels for computers, bearing in mind the existing reference in that Explanatory Note to touch screens and the information given in the present document. It recalls that the Committee should also decide on the terminology to be used in English, that is to say, "touch-sensitive screens" or "touch screens" (see paragraph 7 above).

III. CONCLUSION

16. The Committee is invited to decide on what further action should be taken concerning :

- the classification of the "SattScope 240T" panel;
- insertion of a reference to touch panels in the Explanatory Note to heading 84.71.

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Information communicated by the ICC

TOUCH PANELS

Touch screens or sometimes known as touch panels or digitizers are used as input devices for computing devices. Similar to mouse used in PC, touch screens are mainly used as pointing devices. In general, a touch screen comprised of either one or two transparent panels that are mounted on top of display screens such monitors or LCD panels. The thickness of the touch screen ranges from one to a few millimeters. Depending on the type of applications, different technologies are used to construct the touch screen. The different technologies used are resistive, capacitive, surface acoustic wave (SAW), inductive or optic. Depending on the technologies used, a source such as voltage, current, sound or light wave is applied to the surface of the touch screen. When an external agent, such as a pen or a human hand, touches the surface of the touch, it disturbs the source and by measuring the disturbance, the touch location can be determined.

Tablets are the same as touch screens except that they are not made of transparent material and are not mounted on display screens. Both of them make use of the same set of technologies and are used as input devices to computing devices, but in different applications.

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Basically, the touch panel / touch screen / tablet / digitizer comprises two layers :
a bottom glass (typically 0.7mmt or 1.1mmt)
a top PET film (polyethylene) film (typically 188umt)

The two layers are assembled together using either printed glue or double-sided adhesive tape along the four edges of the touch panel. Typically, there is a small air gap (1-2mm slit in the adhesive) to keep balanced air-pressure within and outside the panel. The space between the glass & film is around 100-150um.

The facing glass and film surfaces are each sputtered with a transparent conductive layer of ITO (Indium Tin Oxide). The top or bottom ITO layers could form either the x- or y-conductive plate. X-plate: two parallel silver traces will be printed on the extreme left (X-) and right (X+) edge of the ITO layer Y-plate: two parallel silver traces will be printed on the extreme top (Y+) and bottom (Y-) edge of the ITO layer. The traces will be routed along the edge of the touch panel (dead area under the glue or adhesive) and then tapped out via a 4-trace-heat-sealed flexible circuit.

The X terminal resistance is measured of the X- & X+ terminals, while the Y terminal resistance is taken off the Y- and Y+ terminal.

When the pressing action of a pen cause the film ITO to touch the glass ITO, the X- & Y- coordinates is calculated by sensing the change in the resistance value with the help of an Analog-to-Digital Converter.

To ensure point contact, small spacers of ~8-10um are screen-printed (square matrix) on top of the glass ITO layer.

This is an example of an analog resistive touch panel.

There are touch panels which make use of capacitive, magnetive (require special pen), etc. mechanisms in the market.

Typical specifications of an analog resistive touch panel:
Mechanical dimensions
Weight
Transparency (typical 79% or 81% or 83%, etc)
Glare or anti-glare surface
Surface hardness (typically >3H pencil hardness)
Actuation force (typically 10gf to 80gf)
X & Y terminal resistance (typically a few hundred ohms to 1000+ ohms)
Linearity (typically +/- 1.5%)
Stroke test (typically 100,000 times, with R0.8 polyacetal pen tip, @250gf)
Tapping test (typically 1,000,000 times, with R8 rubber point, @250gf)

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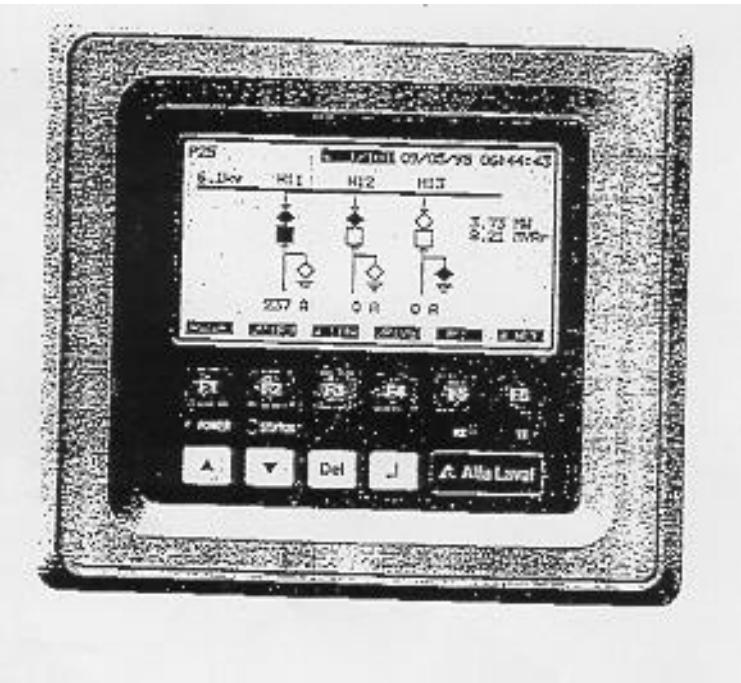
SattScope 240T

SattScope 240T is a panel constructed for applications where the operator can simply affect the process via screen displayed objects.

SattScope 240T has a large 240 x 128 pixel resolution backlit screen divided into 48 touch sensitive areas. Thanks to "touch" technology the functions keys have been reduced to a minimum, thus making display of operator information more visible. For example, you can start/stop motors or open/close valves by simply pressing the object on the screen.

Both SattScope K and J+ can, without any difficulty, be replaced by SattScope 240T, as all three have the same compact format.

- 256 kbyte Flash memory
- Pop-up numerical/application keypad
- Trend curves/bar graphs
- Two serial communication ports
- Alarm management
- Display with 240 x 128 pixel resolution
- Bit maps for static/dynamic display



Alfa Laval Automation's four SattScope™ Operator Panels are constructed for a tough processing environment. Therefore, all the panels have the protection rating IP 65, and of course, they follow the CE requirements. Three of the panels are naturally progressive as upgrading is easily done thanks to the panels having the same physical dimensions and panel cut-out.

All four panels are delivered with the same Microsoft® Windows™ based configuration program, allowing for quick installation and user-friendly interface. In addition, more than 60 alternative communication protocols are included to allow connection to a number of different control systems, for instance, Alfa Laval Automation's SattCon® series. The operator panels also allow for both AC or DC (polarity independent) supply connection.

Four function levels

The panels are used in production plants as local operator panels for input of process values as well as for information of the process status.

- SattScope 240T panel which is equipped with a CCFT-backlit display with 240 x 128 pixel resolution divided into 48 touch sensitive areas, thus simplifying interaction. The panel manages real time trends, uses pop-up numerical/application keypad and has a second serial communication port to be connected to a printer.

Connection possibilities

The SattScope panels can be connected to **SattBus**™, Alfa Laval Automation's fieldbus, via a small module; enabling the panels to operate effectively together with Alfa Laval Automation's other products. SattBus is one of the most commonly used fieldbuses in the process industry. So far, more than 170.000 nodes are connected, within different processes, to parallel or superior systems via SattBus.

TECHNICAL DATA

Hardware	SattScope K	SattScope J+	SattScope 240T	SattScope H
Standard Processor	NEC V20			NEC V40
Display Type	LCD-EL Backlight		LCD-CCFT Backlight	
Display Area	256 x 64 pixels		240 x 128 pixels	640 x 200 pixels
Touch Display	No	No	Yes, 48 areas	No
Database Memory	64 kbytes			
LEDs	4 LEDs - Power, Status, Receive and Transmit			
Keypad - Audible Touch	Membrane Keypad - 22 keys		Membrane - 10 keys	Membrane - 30 keys
Protection Rating	IP65 (NEMA4 x 4/12)	IP65 (NEMA4 x 4/12UL)		IP65 (NEMA4 x 4/12)
Real-time Clock	Set from PLC/keyboard	Yes	Yes	Yes
Function Keys	6 programmable			8 programmable
Memory Type	256 kbytes Flash Memory			512 kbytes Flash Memory
Serial Ports	1 (RS232)	2 (RS232)		
Printer Port	No	Yes	Yes	Yes
COMLI	Yes	Yes	Yes	Yes
SattBus	Yes, option	Yes, option	Yes, option	Yes, option
Power Supply	9 V DC – 35 V DC (24 V AC) polarity independent			
Power Drain	9 V DC – 370 mA / 35 V DC – 95 mA		9 V DC - 720 mA / 35 V DC – 185 mA	9 V DC – 780 mA / 35 V DC – 200 mA
Overall Dimensions	Height 188 mm x Width 208 mm x Depth 51 mm			H 287.4 x W 311 x D 51 mm
Panel Cut Out Dims.	Height 177 x Width197 mm			H 251 x W 294.5 mm
Weight	795 grams			3850 grams
Ambient Temperature	Operating: ±0 to +40°C, Storage: -20 to +60°C			
Humidity	5 to 85 % non-condensing			
Vibration	0.075 mm peak for 10 to 81 Hz, 2 G from 81 to 1000 Hz			
Designed to comply with Part 15 of the FCC Regulations, EN 5022 and CE status				

Software	SattScope K	SattScope J+	SattScope 240T	SattScope H
Alarm Processing	Yes	Yes	Yes	Yes
Windows™ Configurator	Yes	Yes	Yes	Yes
Communications Blocks	100 Blocks			250 Blocks
Analogue Points	250 Points			
Digital Points	200 Points			800 Points
Bits	1000 Bits			2800 Bits
Registers	500 Registers			550 Registers
Text - Variable Size	8 rows x 42 characters (default size)		14 rows x 40 characters	14 rows x 80 characters
Text/Picture Pages	100 Text/Picture Pages			
Overview Groups	100 Overview Groups			
Bar Graphs	No	Yes	Yes	Yes
Bit Maps	No	Yes	Yes	Yes
Trending	No	Yes	Yes	Yes
Host Communication	No	Yes, Modbus RTU Slave	Yes, Modbus RTU Slave	Yes, Modbus RTU Slave
Password	Yes	Yes	Yes	Yes
Protocols	More than 60 alternative communication protocols for a variety of makes of control system accompany the four panels. Only SattBus involves an optional cost.			