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| NUMBER TY 16-526.015-73 |              |
| SHEET 1 OF 15           | SUPERSEDES.. |

I-22471

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AUTOMATIC CIRCUIT BREAKERS A3C (~~A3S~~)  
TECHNICAL SPECIFICATION

TY-16-526.015-73

Revised from I 22471.

AKC

(S. R. Raju)  
27/5/87

|               |              |         |                                                                                             |
|---------------|--------------|---------|---------------------------------------------------------------------------------------------|
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|               | NAME         | SIGN    | DATE                                                                                        |
|               |              |         | APPROVED -                                                                                  |
|               |              |         |  27/5/87 |

C O N T E N T S

1. Technical requirements.

2. Safety engineering.

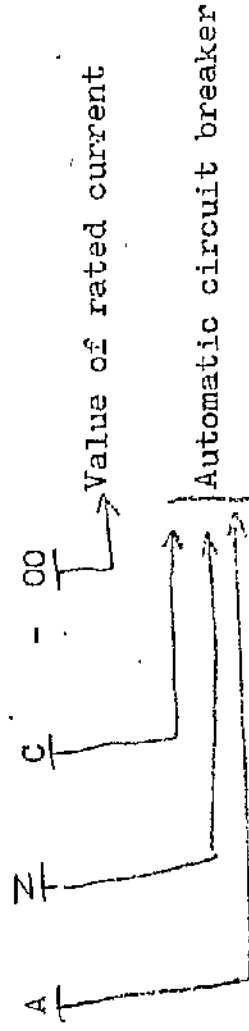
3. Instructions on operation.

Appendix: Overall and mounting dimensions of automatic  
circuit Breakers A 3 C. (AZS).

Present technical specifications apply to automatic circuit breakers A3C - series (hereinafter called as A.C.B) of special purpose for domestic supply as well as for export to countries having temperate and tropical climate.

A.C.B are intended for tripping electric supply to power consumer when there is an over-load and a short circuit in the D.C supply at a voltage of upto 30V in closed stationary and movable installations.

#### Designation of A.C.B



Disignation example of A.C.B with rated current 2A, while ordering and in technical papers for other article should be written as follows:

"Automatic Circuit breaker type A3C-2 TY16-526.015-73"

Designation of automatic circuit breaker with rated current 2A, to be exported to countries, with temperate ~~climate~~ ~~be written as follows~~ climate should be written as follows while ordering and also in technical papers of other article.

"Automatic circuit breaker type A3C-2 export TY16-526.015-73".

Designation example of circuit breaker with rated

current 2A, to be exported to countries with tropical climate, while ordering it and in the technical papers for other articles:

"Automatic Circuit Breaker type A3C-2T TY16-526.015-73"

Note: Abbreviated form of designation may be used in

design documents, for example:

\* Automatic circuit breaker (A.C.B) A3C-2, TY16-526.  
015-73".

## 1. TECHNICAL REQUIREMENTS:

- 1.1 Circuit breakers (A.C.B) should conform to the requirements of the present technical specifications and the complete set <sup>of</sup> technical papers.

## 1.2 BASIC PARAMETERS & DIMENSIONS:

- 1.2.1 Types and main parameters of A.C.B should meet the ones given in Table 1.

Table 1.

| Type of A.C.B. | Rated current<br>of<br>active load<br>A | Rated<br>Voltage<br>V |
|----------------|-----------------------------------------|-----------------------|
| A3C -2         | 2                                       | (27 ± 10%)            |
| A3C -5         | 5                                       |                       |
| A3C -10        | 10                                      |                       |
| A3C -15        | 15                                      |                       |
| A3C -20        | 20                                      |                       |
| A3C -25        | 25                                      |                       |
| A3C -30        | 30                                      |                       |
| A3C -40        | 40                                      | (27 ± 10%)            |
| A3C -50        | 50                                      |                       |

1.2.2 Overall and mounting dimensions, main circuit diagram and mass of circuit breakers must conform to the ones given in enclosure.

1.2.3 A.C.B should have the degree of protection IP30, and removals -IP00 as per GOST 14254-80.

NOTE: Degree of protection is ensured by <sup>the</sup> design and is not subjected to checking at the manufacturing plant.

1.2.4 A.C.B should be provided with a non-trip mechanism.

### 1.3 CHARACTERISTICS:

1.3.1 A.C.B are intended for operating under the following conditions:

- Ambient temperature from - 50°C to + 50°C.
- Relative humidity of surrounding air upto 98% at + 25°C and at lower temperatures without condensation of moisture, at elevated temperatures relative humidity is less;
- low atmospheric pressure.

- 5466 a(41mm. mercury) for A.C.B type A3C-2 and A3C-5, 12133 <sup>17</sup>a (91mm. mercury) for A.C.B type A3C-10, A3C-45, A3C-20, A3C-25, A3C-30, A3C-40, A3C-50.

- Environment-non-explosive not containing current conductive dust, aggressive gases and vapours in such concentration that destroy metal and insulation;

A.C.B should be vibration resistant and vibration proof when the mounting place is subjected to vibration with frequency from 10 to 300  $\frac{1}{2}$  and acceleration not exceeding  $68.7 \text{ m/c}^2$  (7g) and shock proof against a number of impacts with acceleration not exceeding  $98.1 \text{ m/c}^2$  (10g).

Working position of A.C.B in the space is arbitrary.

1.3.2 Insulation of A.C.B should withstand the test voltage for one minute without break down and surpassing -

- a) 500 volts 50 Hz AC under normal working conditions and
- b) 300 V 50 Hz AC under increased humidity.

1.3.3 Insulation resistance, measured with a megger at 100 V, should be not less than:

- a) 20 M $\Omega$  in cold condition and
- b) 6 M $\Omega$  in hot condition corresponding to with rated current at ambient temperature of  $+ 50^{\circ}\text{C}$ ;
- c) 2 M $\Omega$  after being kept in a humidity chamber for 48 hrs with relative humidity of 95 to 98% at  $+ 20 \pm 1^{\circ}\text{C}$ .

1.3.4. Insulation of A.C.B which have undergone commutation endurance should withstand electric strength at a voltage equal to half of testing voltage i.e., 250 V.

1.3.5. The force applied to the handle of A.C.B should be within the limits, stated in table-2.

T A B L E - 2

|                                    |                                  |
|------------------------------------|----------------------------------|
| While engaging all kinematic parts | 1.5 to 4.5 kgf<br>14.7 to 44.1 N |
| While engaging contact parts       | 0.6 to 2.5 kgf<br>5.3 to 24.5 N  |
| While disengaging contact parts    | mini 0.3 kgf<br>mini 2.9 N       |

1.3.6. A.C.B. response time at <sup>37.4</sup>5-A rated and <sup>27.7</sup>2-A rated current should correspond to values given in table-3.

T A B L E - 3

| Type of A.C.B | Over load current | Response time sec. |
|---------------|-------------------|--------------------|
| A3C - 2       | 3-A rated         | 15-45              |
| A3C - 5       | 2-A rated         | 25-65              |
| A3C -10       | 2-A rated         | 15-45              |
| A3C -15       | "                 |                    |
| A3C -20       | "                 |                    |
| A3C -25       | "                 | 20-60              |
| A3C -30       | "                 |                    |
| A3C -40       | "                 |                    |
| A3C -50       | "                 | 25-80              |

Response time spread in the beginning of testing should not exceed  $\pm 15\%$  of <sup>the</sup> average value for A.C.B., of type A ZC-5 to A3 C-50 and  $\pm 25\%$  for A3 C-2 and  $\pm 25\%$  for all types of circuit breakers at the end.

1.3.7. A.C.B should respond during a period not exceeding 30 mins under <sup>pick</sup> up currents and ambient temperatures, indicated in

Table-4.

TABLE-4.

| Type of Circuit breakers | Temperature °C          |                        |
|--------------------------|-------------------------|------------------------|
|                          | + 50                    | - 60                   |
| A2 C-2                   | 1.6 <del>J</del> rated  | 2.5 <del>J</del> rated |
| A3 C-5                   | 1.35 <del>J</del> rated | 2 <del>J</del> rated   |
| A3 C-10                  | 1.4 <del>J</del> rated  |                        |
| A3 C-15                  |                         |                        |
| A3 C-20                  |                         |                        |
| A3 C-25                  | 1.35 <del>J</del> rated | 1.8 <del>J</del> rated |
| A3 C-30                  |                         |                        |
| A3 C-40                  |                         |                        |
| A3 C-50                  |                         |                        |

1.3.8. At ambient temperature of  $+ 50^{\circ}\text{C}$  after warming up with current for 15 mins, A.C.B., should not respond for at least 5 secs, under current of 2 ~~J~~ rated except A3 C-10 type which should not respond for at least 4 secs.



1.3.9. A.C.B should withstand a 10,000 "On-off" cycles (hereinafter referred to as (B-0) of rated current of resistive load at rated voltage commutation endurance as a switch)

1.3.10 Commutation endurance of A.C.B in the mode of automatic operation at over load currents and ambient temperatures should conform to the figures mentioned in Table - 5.

TABLE - 5

| Type of<br>A.C.B | Over load<br>current | Temperature, °C |      | Response     |  |              |  |
|------------------|----------------------|-----------------|------|--------------|--|--------------|--|
|                  |                      | - 60            | + 60 | + 20         |  |              |  |
|                  |                      | Quantity        |      | Time in min. |  | Time in min. |  |
| A3 C-2           | 2.5 $\gamma$ rated   | not more than   |      | Quantity     |  | Not measured |  |
| A3 C-5           | 2 $\gamma$ rated     | not more than   |      | Quantity     |  | Not measured |  |
| A3 C-10          |                      | not more than   |      | Quantity     |  | Not measured |  |
| A3 C-15          | 1.8 $\gamma$ rated   | not more than   |      | Quantity     |  | Not measured |  |
| A3 C-20          |                      | not more than   |      | Quantity     |  | Not measured |  |
| A3 C-25          |                      | not more than   |      | Quantity     |  | Not measured |  |
| A3 C-30          |                      | not more than   |      | Quantity     |  | Not measured |  |
| A3 C-40          | 3 $\gamma$ rated     | not more than   |      | Quantity     |  | Not measured |  |
| A3 C-50          |                      | not more than   |      | Quantity     |  | Not measured |  |
| A3 C-2           | 3 $\gamma$ rated     | not more than   |      | Quantity     |  | Not measured |  |



Table-6

| Type of A.C.B. | Short Circuit Current A*<br>Atmospheric Pressure, mm Hg mercury | Number of Switching off | Short Circuit Current A*<br>Atmospheric pressure mm Hg (of mercury) | Number of Switching off |
|----------------|-----------------------------------------------------------------|-------------------------|---------------------------------------------------------------------|-------------------------|
| A 3 C-2        | 760                                                             |                         | 1213 91 41 546                                                      |                         |
| A 3 C-5        | 1000                                                            |                         | 500                                                                 |                         |
| A 3 C-10       |                                                                 |                         |                                                                     |                         |
| A 3 C-15       |                                                                 |                         |                                                                     |                         |
| A 3 C-20       |                                                                 |                         |                                                                     |                         |
| A 3 C-25       | 1500                                                            | 3                       | 1000                                                                | 2                       |
| A 3 C-30       |                                                                 |                         |                                                                     |                         |
| A 3 C-40       |                                                                 |                         |                                                                     |                         |
| A 3 C-50       |                                                                 |                         |                                                                     |                         |

\*Value of short circuit current for circuit breakers (A.C.B) of A 3 C-2 and A 3 C-5 type is the steady value of Current when by the load is the internal impedance of the A.C.B itself and for the remaining/other ACB it is a pre-set value.

1.3.12 A.C.B should allow a single forced delay of handle in switched on position for 10 Sec at 4 times rated current for and for 100 sec, at 2.5 times rated current cutting the circuit reliably after releasing handle.

1.3.13 Permissible temperature of out put terminals of A.C.B in the continuous operation mode under the rated current load should not exceed 120°C.

## 1.3.14

Voltage drop between bus-bars of movable and stationary contacts (without bimetal link) under the rated current of A.C.B should not be more than 180m.V.

~~1.3.15~~

~~A.C.B~~ should have eye let on the face of handle coated with luminous compound of temporary effect for using in dark places and in the places ~~in~~ provided with red light.

## 1.5.16

Luminous eyelet coated, with compound of temporary effect when exposed to ultra violet rays from a distance not less 0.5m at an angle of 45°C to the axis of A.C.B handle should have sufficient glow brightness so that it can be clearly visible by observer with sight sharpness not less than 0.8 in dark premises from a distance of 0.6m at an angle of 60° to the axis which is the extension of handle.

## 1.3.17

All A.C.B excluding type A3C-2 under ambient temperature + 70°C in ~~at~~ atmospheric pressure 53865 ~~77~~a . . . . . (405mm of mercury) should not respond at rated current for ~~at~~ 5 minutes.

## 1.4

Complete Set.

## 1.4.1

Complete delivery set includes the followings:

- a) batch of circuit breakers.
- b) Group lable (for each box)
- c) technical description and instruction manual on user's request.

## 1.5

Marking.

## 1.5.1

Each A.C.B should bear the following marking:

- a) trade mark of manufacturing plant.
- b) type of A.C.B.
- c) rated current in amperes and voltage in volts
- d) date of manufacture (month, year).
- e) seal of quality control.

Place and method of marking should be mentioned in

drawings for A.C.B.

## 1.5.2 Label affixed onto the box should indicate the following:

type of A.C.B technical specification number, time of manufacture (day, month & year), number of A.C.B packed into the box, notification number and stamp marks of quality control.

## 1.5.3 Following inscriptions should be available on the packages for transportation: "TOP, DO NOT TURN OVER", "FRAGILE", "KEEP DRY".

## 1.6 Packing.

## 1.6.1 A.C.Bs accepted by technical control department should be handed over for packing with disconnected kinematics. A.C.Bs should be packed in plywood boxes, made of glued plywood.

2. SAFETY PRECAUTIONS

## 2.1 A person, handling the A.C.Bs should be specially trained for using the electrical equipment and should be acquainted with general safety rules.

## 2.2 Preventive inspection of automatic circuit breakers should be carried out in the absence of power in device, where the A.C.B is fitted.

## 6. DIRECTIONS FOR USE

6.1. Possibility of operation of A.C.Bs in conditions, different from those mentioned in present technical specifications, technical characteristics of A.C.Bs and also measures to be taken during their use in these conditions, are agreed upon between manufacturer and consumer.

6.2 Cross section of external wires (copper) should be not less than those values given in Table 12.

Table 12

| Type of A.C.B. | Cross section of wires, mm <sup>2</sup> |
|----------------|-----------------------------------------|
| A 3C-2         | 0.35                                    |
| A 3C-5         | 0.5                                     |
| A 3C-10        | 1.0                                     |
| A 3C-15        | 1.5                                     |
| A 3C-20        | 1.93                                    |
| A 3C-25        | 2.5                                     |
| A 3C-30        | 4.0                                     |
| A 3C-40        | 5.15                                    |
| A 3C-50        | 6.0                                     |

6.3 ACBs which were roughly handled should be replaced with new ones.

6.4 It is prohibited to open, repair or adjustment of Automatic circuit breaker.

19 16-526.015-73

8/16

1. (1) Таблицы и установочные размеры,

электрическая схема и масса автоматического

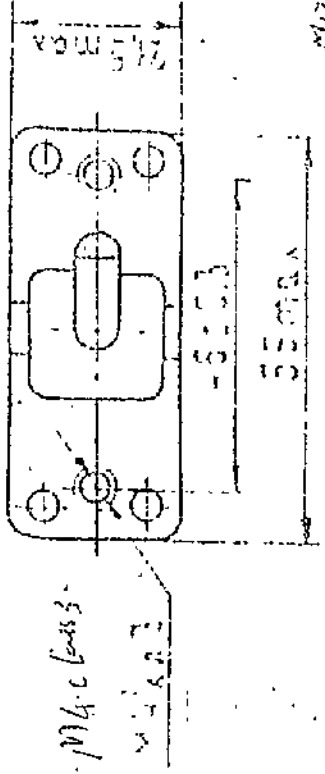
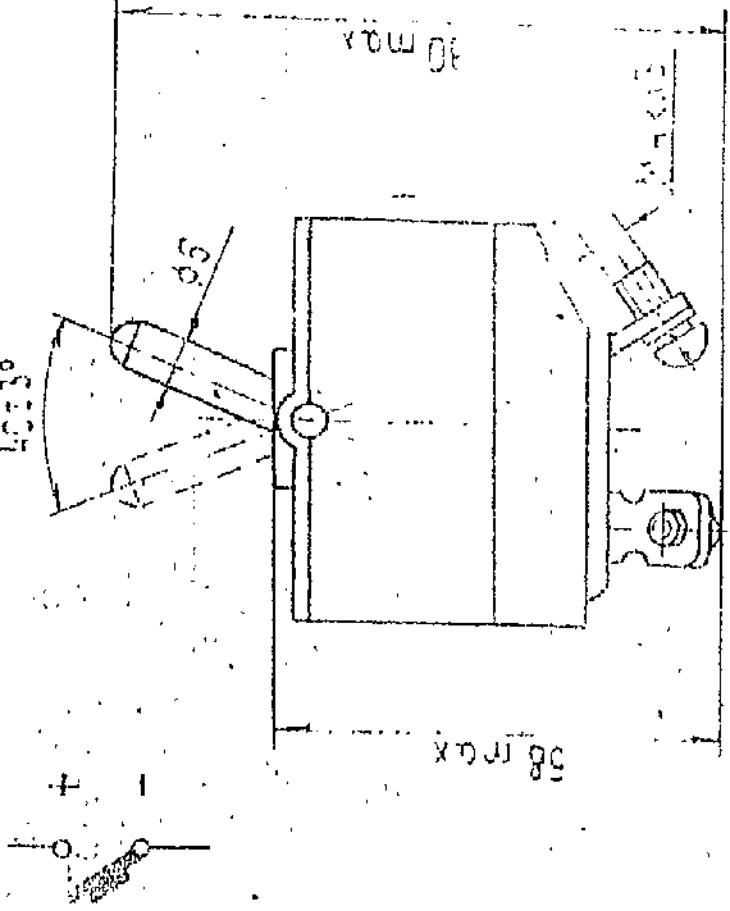
серии АЗС.

CIRCUIT DIAGRAM AND MOUNTING DIMENSIONS, CIRCUIT DIAGRAM

AND MASS OF AUTOMATIC CIRCUIT BREAKERS AZC.

электрическая (24)

схема



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