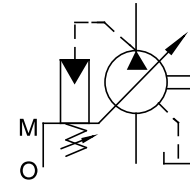




"A" Series Variable Displacement Piston Pumps – Single Pump, Pressure Compensator Type



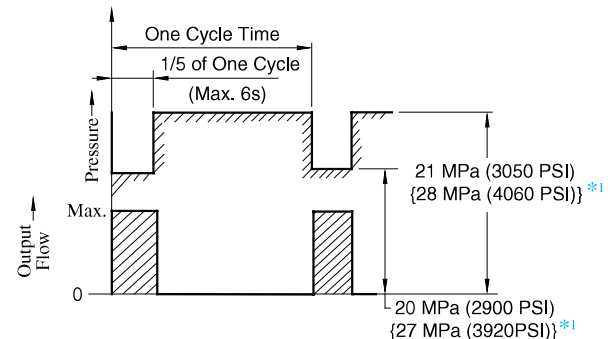
Graphic Symbol



Specifications

| Model Numbers | Geometric Displacement cm ³ /rev (cu. in. /rev) | Minimum Adj. Flow cm ³ /rev (cu. in. /rev) | Operating Pressure MPa (PSI) | | Shaft Speed Range r/min | | Approx. Mass kg (lbs.) | |
|--------------------|--|---|---------------------------------|----------------------------|----------------------------|------|---------------------------|-------------|
| | | | Rated ^{*2} | Intermittent ^{*1} | Max. | Min. | Flange Mtg. | Foot Mtg. |
| A10-FR01B-12* | 10.0 (.610) | 2 (.122) | 16 (2320) | 21 (3050) | 1800 | 600 | 5.1 (11.2) | — |
| A10-FR01C/H-12* | | | | | | | 8.5 (18.7) | |
| A16-*-R-01-*-K-32* | 15.8 (.964) | 4 (.244) | 16 (2320) | 21 (3050) | 1800 | 600 | 16.5 (36.4) | 18.7 (41.2) |
| A22-*-R-01-*-K-32* | 22.2 (1.355) | 6 (.366) | 16 (2320) | 16 (2320) | 1800 | 600 | 16.5 (36.4) | 18.7 (41.2) |
| A37-*-R-01-*-K-32* | 36.9 (2.25) | 10 (.610) | 16 (2320) | 21 (3050) | 1800 | 600 | 28.0 (61.7) | 32.3 (71.2) |
| A56-*-R-01-*-K-32* | 56.2 (3.43) | 12 (.732) | 16 (2320) | 21 (3050) | 1800 | 600 | 35.0 (77.2) | 39.3 (86.7) |
| A70-*R01*S-60* | 70.0 (4.27) | 30 (1.83) | 25 (3630) | 28 (4060) | 1800 | 600 | 58.5 (129) | 70.5 (155) |
| A90-*R01*S-60* | 91.0 (5.55) | 56 (3.42) | 25 (3630) | 28 (4060) | 1800 | 600 | 72.5 (160) | 93 (205) |
| A145-*R01*S-60* | 145 (8.85) | 83 (5.06) | 25 (3630) | 28 (4060) | 1800 | 600 | 92.5 (204) | 117.5 (259) |

- ★ 1. Whenever setting pressure, make sure the full cut-off pressure never exceeds the maximum intermittent pressure.
- ★ 2. Care should be taken in cases of used at a higher pressure than the rated pressure, because operating terms may be restricted. For example, if used as per maximum illustrated operating conditions, intermittent time at maximum flow is restricted to under 1/5 of one cycle time and under six seconds simultaneously. Conditions may vary according to the actual working pressure and delivery (inclination angle of the swash plate). Consult factory or Yuken sales representative for further information.
- ★ 3. The table above shows specifications for using petroleum based oils. Pumps (customized design) for special fluids are also available. Their operating pressure and maximum shaft speed however differ from the values in the table above depending on the fluid type. Range of operating temperature and viscosities may differ from those of petroleum based oils due to their characteristics.



*1. Applicable only for "A70/90/145"

Specifications and Design numbers for Special Fluids

| Type of Fluids | Pump Series | Operating Pressure MPa (PSI) | | Allowable Maximum Shaft Speed r/min | | Temperature Range °C (°F) | Viscosity Range mm ² /s (SSU) | Design Numbers for Special Fluid (Occasion of Japanese Std. "JIS") ^{*3} |
|----------------------|-------------|---------------------------------|--------------------------------------|--|----------------------|------------------------------|---|---|
| | | Rated | Intermittent | Rated | Max. | | | |
| Water-Glycols | A16 – A56 | 14(2030) | 16(2320) {14(2030)} ^{*1} | 1200 | (1800) ^{*2} | 0 - 50 (32 - 104) | 20 - 200(98 - 927) | 3230 |
| | A70 – A145 | 21(3050) | 21(3050) | | | | | 6030 |
| Phosphate Ester Type | A16 – A56 | 14(2030) | 16(2320) {14(2030)} ^{*1} | 1200 | (1800) ^{*2} | 0 - 60 (32 - 140) | 20 - 200(98 - 927) | 3206 |
| | A70 – A145 | 21(3050) | 21(3050) | | | | | 6006 |
| Polyol Ester Type | A16 – A56 | 16(2320) | 16(2320) | 1800 | 1800 | 0 - 60 (32 - 140) | 20 - 200(98 - 927) | 32450 |
| | A70 – A145 | 21(3050) | 21(3050) | | | | | 60450 |

- ★ 1. The figures in brackets are for A22 type.
- ★ 2. As the specific gravities of water-glycol fluids and phosphate ester type fluids are higher than one, an overhead reservoir is required when pumps are operated at 1500 r/min or more.
- ★ 3. For the design numbers of pumps for European Design and North American Design Standards, please contact us.

Model Number Designation

| A16 | -F | -R | -01 | -B | -S | -K | -32 | * | | | |
|---|-----------------------|-------------------------|--------------------------------------|--|-------------------------|-----------------------|---------------|------------------------|--|--|---------------------|
| Series Number | Mounting | Direction of Rotation | Control Type | Pres. Adj. Range MPa (PSI) | Port Position | Shaft Extension | Design Number | Design Std. | | | |
| A16 (15.8 cm ³ /rev) | F: Flange Mtg. | (Viewed from Shaft End) | 01: Pressure Compensator Type | B: 1.2 - 7 (170 - 1020) C: 1.2 - 16 (170 - 2320) H: 1.2 - 21 (170 - 3050) | None: Axial Port | K: Keyed Shaft | 32 | Refer to ^{*2} | | | |
| A22 (22.2 cm ³ /rev) | | | | B: 1.2 - 7 (170 - 1020) C: 1.2 - 16 (170 - 2320) | | | | | | | |
| A37 (36.9 cm ³ /rev) | | | | L: Foot Mtg. | | | | | R: Clockwise (Normal) ^{*1} | B: 1.2 - 7 (170 - 1020) C: 1.2 - 16 (170 - 2320) H: 1.2 - 21 (170 - 3050) | S: Side Port |
| A56 (56.2 cm ³ /rev) | | | | | | | | | | | |

| A70 | -F | R | 01 | B | S | -60 | * | |
|---|-------------------------------------|-------------------------|--------------------------------------|---|---------------------|---------------|------------------------|-----------|
| Series Number | Mounting | Direction of Rotation | Control Type | Pres. Adj. Range MPa (PSI) | Port Position | Design Number | Design Std. | |
| A10 (10.0 cm ³ /rev) | F: Flange Mtg. ^{*3} | (Viewed from Shaft End) | 01: Pressure Compensator Type | B: 1.2 - 7 (170 - 1020) ^{*4} C: 2.0 - 16 (290 - 2320) H: 2.0 - 21 (290 - 3050) | — | 12 | Refer to ^{*2} | |
| A70 (70.0 cm ³ /rev) | F: Flange Mtg. | | | B: 1.2 - 7 (170 - 1020) C: 1.5 - 16 (220 - 2320) H: 1.8 - 21 (260 - 3050) K: 2.0 - 28 (290 - 4060) | S: Side Port | | | |
| A90 (91.0 cm ³ /rev) | L: Foot Mtg. | | | R: Clockwise (Normal) ^{*1} | | | | 60 |
| A145 (145 cm ³ /rev) | | | | | | | | 60 |

- ★ 1. Available to supply pump with anti-clockwise rotation. Consult Yuken for details.
- ★ 2. Design Standards: None Japanese Standard "JIS"
80 European Design Standard
950 N. American Design Standard

- ★ 3. When A10 pump is used as the foot Mtg., order the Mtg. Bracket kit shown below separately. Refer to page 24 for dimensions of the Mtg. bracket.
Note: The mounting bracket kit consists of a mounting bracket, two hex. bolts and two plain washer.

| Mtg. Bracket Kit Numbers | Approx. Mass kg (lbs.) |
|--------------------------|------------------------|
| LP-1A-10 | 2.2 (4.9) |

- ★ 4. The pressure adjustment range "B" is not available to the European Design Standard and the N. American Design Standard of "A10".

Pipe Flange Kits

Pipe flange kits are available. When ordering, specify the kit number from the table below.

| Pump Model Numbers | Name of Port | Pipe Flange Kit Numbers | | | | | | |
|--------------------|--------------|-------------------------|----------------------|---------------------------------------|--|---------------------------------------|--|---------------------------------------|
| | | Threaded Connection | | | Socket Welding ^{*1} | | Butt Welding | |
| | | Japanese Std. "JIS" | European Design Std. | N. American Design Std. ^{*2} | Japanese Std. "JIS" European Design Std. | N. American Design Std. ^{*2} | Japanese Std. "JIS" European Design Std. | N. American Design Std. ^{*2} |
| A16-*R-01 | Suction | F5-06-A-10 | F5-06-A-1080 | — | F5-06-B-10 | F5-06-B-1090 | F5-06-C-10 | F5-06-C-1090 |
| A22-*R-01 | Discharge | F5-06-A-10 | F5-06-A-1080 | — | F5-06-B-10 | F5-06-B-1090 | F5-06-C-10 | F5-06-C-1090 |
| A37-*R-01 | Suction | F5-10-A-10 | F5-10-A-1080 | — | F5-10-B-10 | F5-10-B-1090 | F5-10-C-10 | F5-10-C-1090 |
| A56-*R-01 | Discharge | F5-10-A-10 | F5-10-A-1080 | — | F5-10-B-10 | F5-10-B-1090 | F5-10-C-10 | F5-10-C-1090 |
| A70-*R01 | Suction | F5-12-A-10 | F5-12-A-1080 | — | F5-12-B-10 | F5-12-B-1090 | F5-12-C-10 | F5-12-C-1090 |
| | Discharge | F5-08-A-10 | F5-08-A-1080 | — | F5-08-B-10 | F5-08-B-1090 | F5-08-C-10 | F5-08-C-1090 |
| A90-*R01 | Suction | F5-16-A-10 | F5-16-A-1080 | — | F5-16-B-10 | F5-16-B-1090 | F5-16-C-10 | F5-16-C-1090 |
| A145-*R01 | Discharge | F5-10-A-10 | F5-10-A-1080 | — | F5-10-B-10 | F5-10-B-1090 | F5-10-C-10 | F5-10-C-1090 |

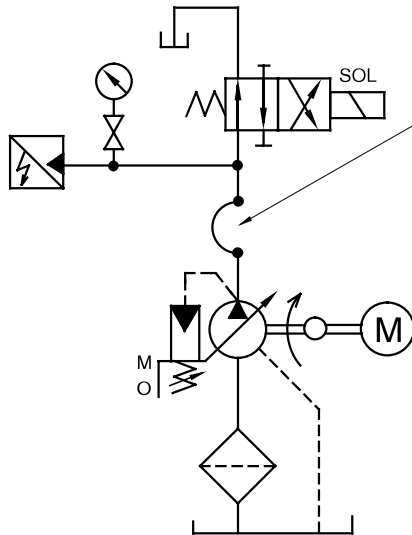
- ★ 1. In case of using socket welding flanges, there is a case where the operating pressure should be set lower than the normal because of strength of the flanges. Therefore, please pay cautious attention to the operating pressure when the socket welding flanges are used.
- ★ 2. As dimensions of the pipe flange mounting surface are conformed to SAE 4 Bolt Split Flange (Standard Pressure Series), pipe flanges conforming to the SAE Standards can be used.
- Details of the pipe flange kits are shown on page 824.



Response Characteristics Change in Accordance with Circuits and Operating Conditions.

Test Circuit and Conditions

Circuit



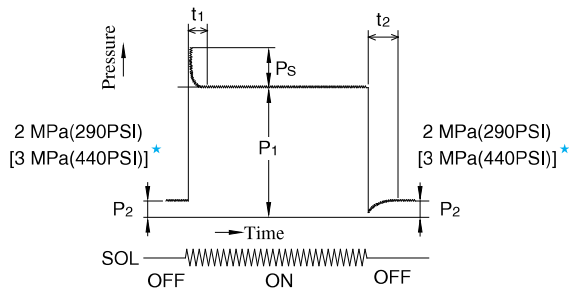
Conditions

- Drive Speed : 1500 r/min
- Hydraulic Fluid : ISO VG32 oil
- Oil Temperature : A10-A56: 50 °C (122 °F) [Viscosity 20 mm²/s (100 SSU)]
A70-A145: 40 °C (104 °F) [Viscosity 32 mm²/s (150 SSU)]

High Pressure Rubber Hose

| Model | Ruber Hose Size |
|-------------|---|
| A10 | 1/2" × 800 mm (2.6 ft.) |
| A16 A22 | 3/4" × 700 mm (2.3 ft.) |
| A37 A56 | 3/4" × 2000 mm (6.6 ft.) |
| A70 | 3/4" × 3500 mm (11.5 ft.) |
| A90 A145 | 3/4" × 3000 mm (9.8 ft.) + 1-1/4" × 2000 mm (6.6 ft.) |

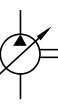
Result of Measurement



★ Applicable only for "A90/A145"

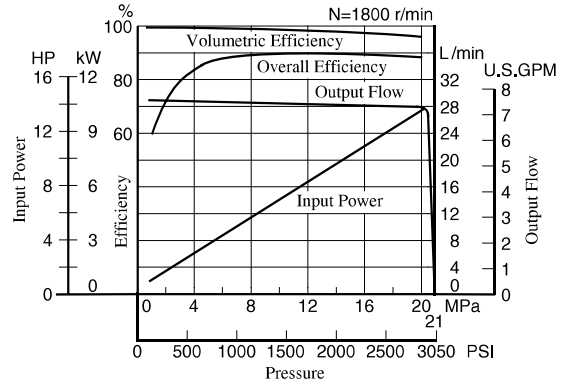
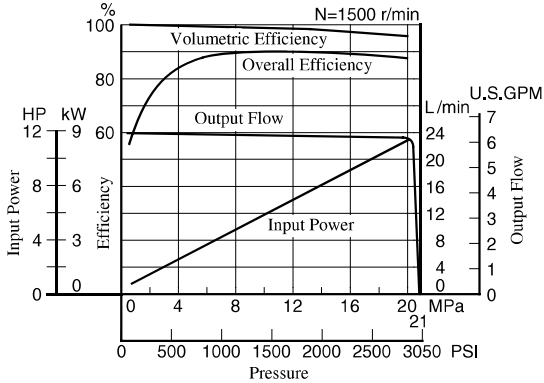
| Model | Full Cut-off Pressure P ₁ MPa (PSI) | Response Time ms | | Overshoot Pressure P _S MPa (PSI) |
|-------|--|------------------|----------------|---|
| | | t ₁ | t ₂ | |
| A10 | 21 (3050) | 100 | 75 | 2.6 (380) |
| A16 | 16 (2320) | 38* | 59* | 3.6 (520) |
| A22 | 16 (2320) | 30* | 72* | 5.9 (860) |
| A37 | 16 (2320) | 40* | 78* | 7.8 (1130) |
| A56 | 16 (2320) | 38* | 88* | 7.6 (1100) |
| A70 | 25 (3630) | 80 | 100 | 7.8 (1130) |
| A90 | 25 (3630) | 90 | 110 | 7.9 (1150) |
| A145 | 25 (3630) | 100 | 150 | 8.8 (1280) |

* Response time except A10, A70, A90 and A145 is measured Yoke travel.



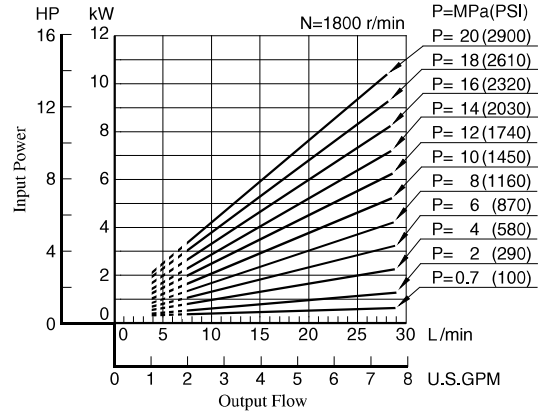
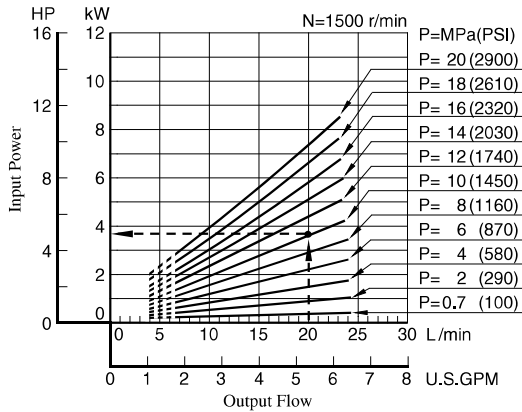
Typical Performance Characteristics of Type "A16" at Viscosity 20 mm²/s (100 SSU) [ISO VG32 Oils, 50°C (122°F)]

Performance Characteristic Curve

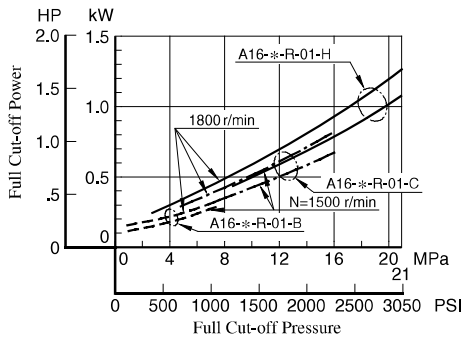


Input Power

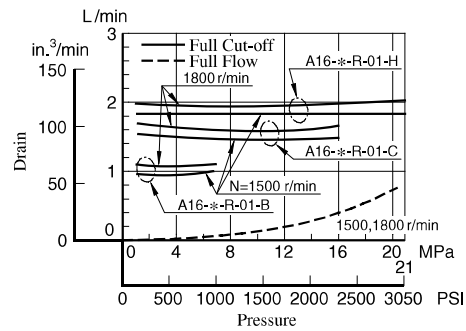
Example: At a pressure of under 10 MPa (1450 PSI), a flow 20 L/min (5.3 U.S.GPM), and rotation 1500 r/min, the axial input becomes about 3.7 kW (5 HP) as shown the dotted line in the graph.



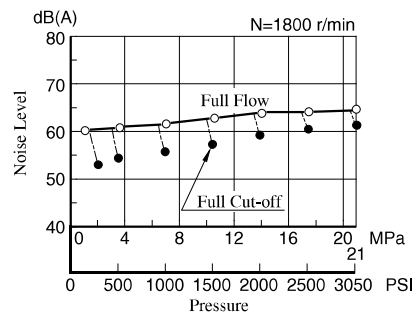
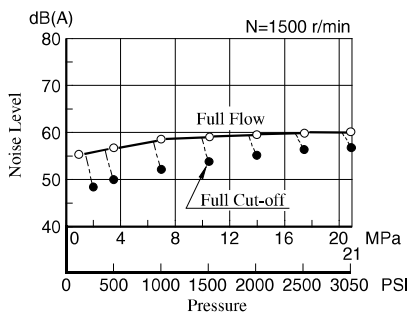
Full Cut-off Power



Drain

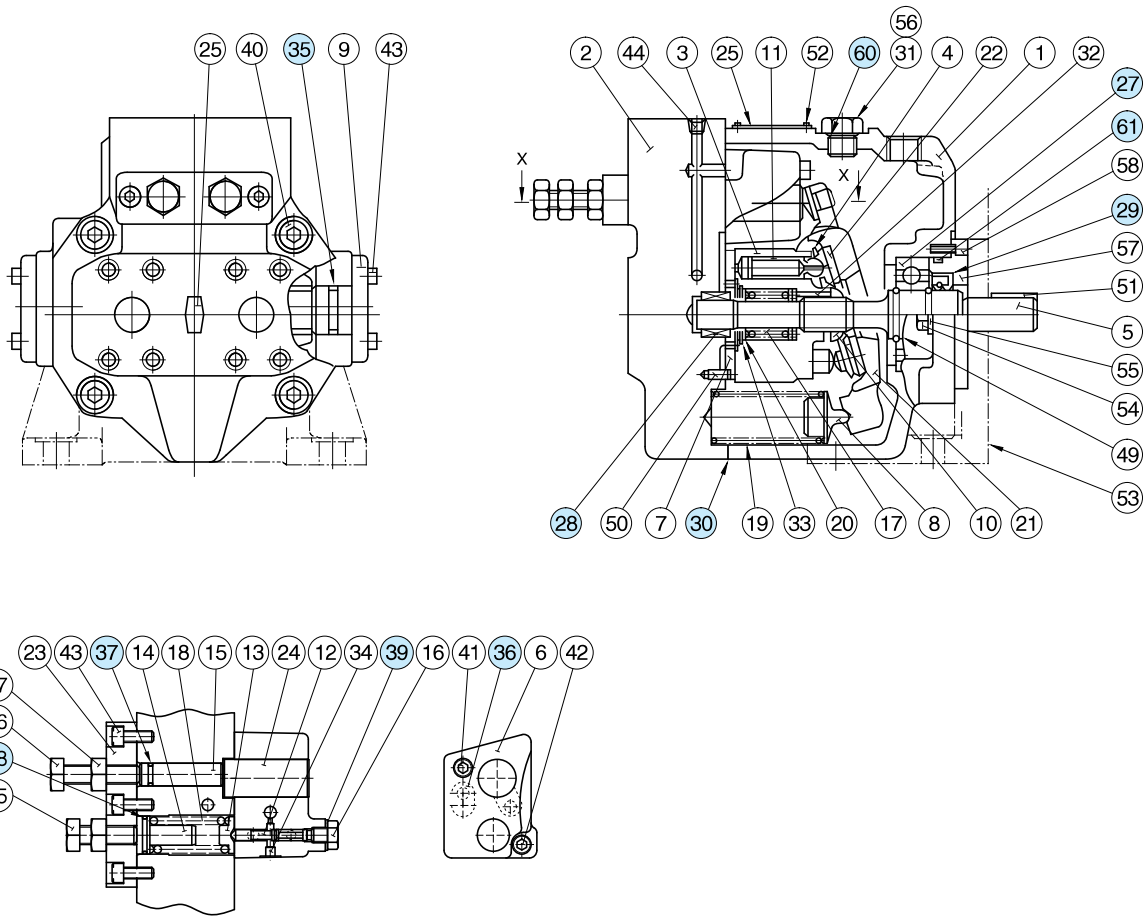


Noise Level [One metre (3.3 ft.) horizontally away from pump head cover]



Spare Parts List

A16/A22/A37/A56-*-R-01-*-K-32/3280/32950



Section X-X

● List of Seals and Bearings

| Item | Name of Parts | Part Numbers | | | | Qty. |
|------|---------------|-----------------|---------------------|-----------------|-----------------|------|
| | | A16-*-R-01 | A22-*-R-01 | A37-*-R-01 | A56-*-R-01 | |
| 27 | Bearing | 6305 | | 6307 | NUP 207E | 1 |
| 28 | Bearing | HMK 1715 | Z30-1303-PK410300-8 | HMK 2025V2 | HMK 2530V2 | 1 |
| 29* | Oil Seal | TCN 254511 | | TCN 355511 | TCN 355511 | 1 |
| 30* | Gasket | 1303-PK211969-1 | | 1316-PK211970-9 | 1307-PK211971-7 | 1 |
| 35* | O-Ring | SO-NA-G25 | | SO-NA-G30 | SO-NA-P36 | 2 |
| 36* | O-Ring | SO-NB-P12 | | SO-NB-P10A | | 1 |
| 37* | O-Ring | SO-NB-P9 | | | | 1 |
| 38* | O-Ring | SO-NA-A017 | | | | 1 |
| 39* | Seal Washer | W8 | | | | 1 |
| 60* | O-Ring | SO-NB-P14 | | | | 1 |
| 61* | O-Ring | SO-NA-G55 | | SO-NA-G75 | | 1 |

★When ordering seals, please specify the seal kit number from the table below.

● List of Seal Kits

| Pump Model Numbers | Seal Kit Numbers |
|----------------------|------------------|
| A16-*-R-01-*-K-*-32* | KS-A16-01-32 |
| A22-*-R-01-*-K-*-32* | |
| A37-*-R-01-*-K-*-32* | KS-A37-01-32 |
| A56-*-R-01-*-K-*-32* | KS-A56-01-32 |